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TWO HUNDRED AND NINETY-EIGHTH MEETING,
NOVEMBER 2, 1916.

The 298th regular meeting of the Society was entertained by Dr. A. L. Quaintance at the Saengerbund Hall, November 2, 1916. There were present Messrs. Abbott, Baker, Barber, Böving, Busck, Caudell, Craighead, Ely, Fisher, Gahan, Greene, Heinrich, Hyslop, Isely, Kotinsky, McIndoo, Middleton, Paine, Quaintance, Rohwer, Sanford, Sascer, Schwarz, Snyder, Walton, Webb, Wood, and Yothers, members, and T. G. Carnochan, R. M. Fouts, J. R. Horton, Philip Garman, Delmar Webb, and W. W. Yothers, visitors.

The following program was presented.

A NEW GENUS (PERISSARTHRON) OF ELATERIDAE AND A
REVISION OF THE AMERICAN ELATERIDAE OF THE GENUS
PYROPHORUS, WITH DESCRIPTIONS OF NEW SPECIES.

By J. A. HYSLOP,

Bureau of Entomology, Cereal and Forage Insect Investigations.

Perissarthron gen. nov.

(Plate I.)

Frontal margin of the head obsolete above insertion of the labrum (fig. *a*), front concave, labrum moderately broad; mouth directed forward and downward; mandibles cleft at tip; maxillary palpi narrowly secundiform; antennae (fig. *b*), 12 jointed, joints 3 and 4 equal in length; prothorax wider than long, prosternal sutures nearly straight, lateral margins broadly flattened; posterior coxae (fig. *c*) complete, strongly widened inwardly, but without abrupt angle; tarsi simple, bearing heavy brushes of pile on under surface of joints, tarsal claws (fig. *d*) simple.

This genus is erected to receive the remarkable species *Corymbites trapezium* of Leconte¹ (Plate I, fig. *b*), from Texas, of which *Corymbites trapezicollis* Schw.² is a synonym. Schwarz refers this species to the genus *Ludius*,³ so the synonymy will stand as follows:

Perissarthron trapezium (Lee.) Hyslop

Corymbites trapezium Lee.

Corymbites trapezicollis Schw.

Ludius trapezium (Lee.) Schw.

Ludius trapezicollis (Schw.) Schw.

This species has generally been described as having eleven joints with the 11th strongly constricted or appendiculate. This is an error, the so-called constriction really being a distinct segmentation (fig. *f*), as can easily be demonstrated with a relaxed specimen as the 12th moves freely on the true 11th segment and cannot be compared with the condition of constriction found in certain *Melanactes* and several species of true *Ludius* (*Corymbites*).

Through the kindness of Dr. Skinner of the Philadelphia Academy of Natural Sciences, I have had the opportunity of examining the female of this species in the Horn collection. It differs from the male in the pronotum being as wide at the middle as at the posterior angles, with the sides strongly arcuate. The antennae when directed backward do not attain the posterior angles, consequently joints 4 to 11 are materially shorter in comparison to their diameter than in the male.

The genus will probably fall into the tribe *Ludiini* but its position cannot be definitely ascertained until the larva has been described.

Pyrophorus Illiger.

This genus was established by Illiger in 1809⁴ to include those species of the Elateridae having luminous vesicles on the pronotum. This character serves to identify the genus, which is confined to tropical America, both North and South, and the West Indies, with the exception of a few forms which agree with this genus in all characters, save the luminous spots. But one species has been recognized from North America north of Mex-

¹ Proc. Acad. Nat. Sc. Philad., Vol. 18, p. 392, Dec., 1866.

² Deut. Ent. Zeit., 1903.

³ Gen. Ins.

⁴ Mag. d. Gesellsch. Nat. Freund. Berl. I. p. 141 1809.

ico, *Pyrophorus physoderus* of Germar described in 1841,¹ from Alabama.

In examining the material in the National Museum and in the private collections of Messrs. W. M. Mann and Chas. Schaeffer, I have found three more species.

The four North American species can be separated easily upon external characters, but the most conclusive characters for their determinations are in the male genitalia. The following table will serve to differentiate the four species now recognized from North America:

- A. Conspicuous tubercle on base of the pronotum in front of the scutellum.
 - a. Tubercle conical..... *texanus* sp. nov.
 - b. Tubercle laterally compressed..... *arizonicus* sp. nov.
- AA. No pronotal tubercle in front of the scutellum.
 - a. Antennae of the male long (when directed backward extending 3 joints beyond the posterior angles). Pronotum usually with decided impressions..... *physoderus* Germar.
 - b. Antennae of male but one joint longer than the pronotum. No decided impressions on the pronotum: *atlanticus* sp. nov.

In the North American species the females agree with the males, except that they are usually larger and have the pronotum much broader with its side margins more rounded and the disk much more globose. In all our North American species the antennae of the females are shorter than the pronotum, while in the males they are as long as or longer than the pronotum. Small females occasionally occur and size cannot be considered as a character of much value. I have not examined the female of the *physoderus* of Germar. In deciding which of the four species from this country is the true *physoderus* of Germar, the following facts must be taken into consideration: Germar described the species from Alabama. None of the specimens which I have had opportunity to examine were collected in Alabama, though the series which I consider as *physoderus* were collected on the Cedar Keys, which are on the upper inner gulf coast of Florida not very far removed from that part of Alabama which reaches the Gulf. Germar distinctly says, in his preliminary analysis of this species, that the antennae are less than one-half the length of the body, while in his further discussion of the species, he says that they are somewhat longer than the prothorax. The species recognized as *physoderus* in the collections examined, was collected from the east coast of Florida. It agrees with Germar's

¹ Zeitsch. f. d. Entom. III, p. 36, 1841.

description in being dark brown. However, the antennae in this species are very slightly longer than the pronotum and are certainly nowhere near half the length of the body. On the other hand, the west coast species which I consider the true *physoderus* of Germar is not as dark brown as the east coast

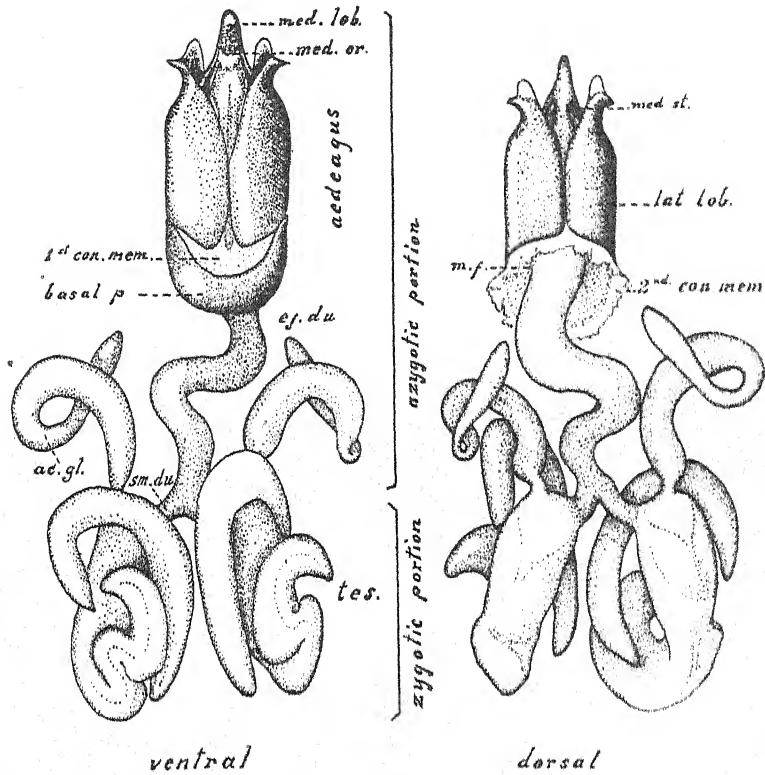


Fig. 1. Dorsal and ventral aspects of the male genital apparatus of *Pyrophorus*.

species and the antennae of the male are equal to fully one-half the total length of the body.

The east coast species, which I have named *Pyrophorus atlanticus*, is entirely lacking the impressed grooves on the disk of the pronotum, which Germar specifically mentions and which are very pronounced in the species from the Cedar Keys. Both of these Florida species lack the basal tubercle on the pronotum.

Candeze in his Monograph places *physoderus* Germar among those forms having a tubercle at the middle of the base of the prothorax. I believe this to be an error and that the specimen before Candeze was not the *physoderus* of Germar, but a then undescribed species. He gives the locality as Mexico and Southern United States. To the form which he described, I have given the name *Pyrophorus texanus*. Germar does not mention the pronotal tubercle in his description of the species and as he mentioned it in several of his other species, I believe that this character alone can eliminate the Arizona and Texas species from *physoderus* of Germar.

The genitalia of *Pyrophorus* (Text fig. 1) can be divided into

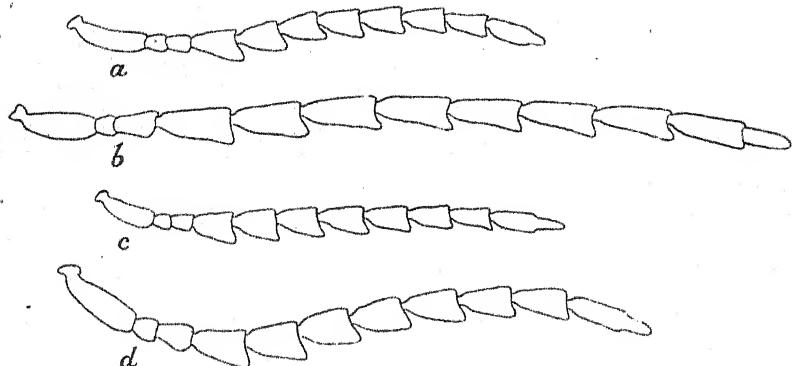


Fig. 2. Antennae of *Pyrophorus*. a, *P. texanus*; b, *P. physoderus*, c, *P. atlanticus*; d, *P. arizonicus*.

two parts, the azygotic portion lying anterior to the junction of the seminal ducts and the zygotic portion lying posterior to this junction. The zygotic portion consists of the testes (tes.), the accessory glands (ac. gl.) and the seminal ducts (sm. du.) and is without the scope of this paper. The zygotic portion consists of the ductus ejaculatorius (ej. du.) and of the aedeagus. In most coleopterous males, the azygotic portion is divided into a widened internal sack and a slender stenazygotic portion. In the Elateridae, however, these parts are undifferentiated. The aedeagus is divided into the tegmen and the median lobe. The tegmen consists of a basal, ring-like, articulating plate (*basal p.*) and two opposed scoop-shaped lateral lobes (*lat. lob.*), one on either side of the median lobe (*med. lob.*). The median lobe has a heavily chitinized dorsal part with two median struts (*med. st.*) on its upper surface and the median orifice (*med. or.*)

on its ventral surface. The sides are membranous and the ventral surface is more or less chitinized. The lateral lobes articulate freely on the basal piece and are connected therewith by the first connective membrane (*1st con. mem.*). The whole aedeagus is connected with the body wall by the second connective membrane (*2nd con. mem.*). The lateral lobes often bear outwardly directed spines and anterior flabellae. The form, number of spines and comparative length and shape of these plates are remarkably constant in all the specimens in the various species of Elateridae examined by the writer and are of decided specific value. The terminology used in this paper is that used by Sharp and Muir¹ in their excellent Memoire on the male genital tube.

The following table will serve to differentiate the four species now recorded from North America as based upon the male genital characters:

A. Lateral lobes of genitalia with a median, outwardly directed spine in addition to the terminal spine (Plate II, fig. *g*).
arizonicus sp. nov.

AA. Lateral lobes without median spine.

a. Sides of the lateral lobes parallel, suddenly constricted near outer fourth; median lobe without ridged depression on upper surface (Plate II, fig. *f*).....*texanus* sp. nov.

b. Lateral lobes gradually attenuated from base to tip, median lobe with prominently margined dorsal depression.

1. Median lobe narrow as tip of lateral lobe (Plate II, figs. *c, d, e*).....*atlanticus* sp. nov.

2. Median lobe twice as broad as tip of lateral lobe (Plate II, figs. *a* and *b*).....*physoderus* Germ.

Pyrophorus physoderus Germ.²

(Plate III, fig. *c*)

"Piceus, fusco-pubescent, thorace suboblongo, convexo, lateribus anteris deflexo, maeulis vesicularibus angularibus, antennis corporis dimidio brevioribus, elytris punctato-striatis, apice muticis. Habitat in Alabama Americae borealis (Gory.).

"Dem *P. pyralis* verwandt, aber kleiner, dunkler braun, das Halschild an den Seiten nach vorn tiefer herabgebogen, die Fühler kürzer und die Deckschilder an der Spitze ungedornt.

¹ The Comp. Anat. of the Male Gen. Tube in Coleo. Trans. Ent. Soc. Lond. Part III, Dec. 24, 1912.

² Zeit. f. d. Ent. III, p. 36, 1841.

"7-8 Lin. lang, $2\frac{1}{2}$ Lin. breit, dunkelbraun, mit niederliegenden, graublauen Härcchen ziemlich dicht bekleidet, Fühler und Beine heller braun. Kopf ziemlich gross, Stirn etwas länger als breit, wenig eingedrückt, grob punktiert. Fühler etwas länger als das Halsschild, deutlich gesägt, das dritte Glied halb so lang wie das vierte. Halsschild wenig länger als breit, in der Mitte ein halbmal breiter wie der Kopf, der Länge nach gewölbt, die Seiten von der Mitte weg nach vorn niedergebogen und stark nach den Vorderecken hin gerundet, Hinterdornen ast gerade. Im Mittelfelde zwei mehr oder minder tief eingedrückte Grübchen. Die Oberfläche dicht punktiert, mit Spuren einer glatten, etwas erhabenen Mittellinie. Leuchtflecke vor den Hinterdornen, eirund, schief, gleich weit vom Seitenrande wie vom Hinterrande entfernt, am Rande punktiert. Auf der Unterseite ein dreieckiger, gelber, durchscheinender Fleck im Hinterwinkel. Schildehnen länglich, an der Wurzel abgestutzt.

"Decksschilder gewölbt, punktiert-gestreift, die Zwischenräume dicht punktiert, die Seiten von der Mitte nach der gerundeten Spitze hin allmählich verengt."

The sides of the pronotum are convergent from the base, practically straight and suddenly narrowed at the apex. The posterior angles are acute and divergent. No pronotal tubercle in front of the scutellum. The disk of the pronotum usually bears four elongate impressions, two near the middle of the disk and two near the base. The luminous vesicles are as near the lateral border as the posterior border of the posterior angles and are distinctly visible from below. The color is reddish brown and the vestiture is grayish yellow and moderately sparse. The elytra are parallel to the posterior third and are not mucronate at the tip. Joint 3 of the antenna is longer than 2, joint 11 is strongly apenticulate, giving the impression of a 12th joint. In the male the antennae (text fig. 2 b) extend 3 joints beyond the posterior angles of the pronotum when directed backward. Antennal joint 3 is not serrate and is decidedly narrower and more like joint 2 than joint 4. Joints 4, 5 and 6 with sides subparallel, twice as long as broad and slightly serrate.

Aedeagus with median lobe very broad, rounded at tip, broadly spatulate-concave above at tip, median orifice less than one-half width of median lobe at that point from tip. Lateral lobes attenuate from base to tip, distal spine declivous, compressed. No lateral spine.

Male, 15 to 20 mm. long, 3 to 6 mm. wide.

Specimens examined: 1 ♂ Florida (Chas. Schaeffer), 6 ♂♂ Cedar Keys (Hubbard & Schwarz).

Pyrophorus arizonicus sp. nov.¹(Plate III, figs. *f*, *g*.)

Sides of the prothorax parallel, strongly rounded anteriorly; posterior angles acute, divergent, carinate with laterally compressed strong tubercle on the pronotum immediately in front of the scutellum; pronotum bearing a pair of longitudinal impressions near the base. Luminous vesicles as near the lateral border as the posterior border of the posterior angles and distinctly visible from below. Color dark reddish brown, vestiture not modifying the color of the integument. Elytra attenuate beyond the middle, the tip not mucronate. Antennal joint 3 longer than 2 and distinctly shorter and narrower than 4; joints 4, 5 and 6 strongly serrate, not twice as long as broad; joint 11 constricted at outer third (text fig. 2 *d*).

Aedeagus with lateral lobes strongly narrowed at outer third, bearing stout spine on outer side beyond middle. Lateral and distal spines strongly deflexed, lateral lobes moderately densely covered with stout erect hairs beyond lateral spine. Medial lobe strongly narrowed. On outer third narrower than end of lateral lobes, end very slender, concave above; lower chitinized plate of median lobe broader than upper plate, visible from above. Median lobe not deflexed at tip. Median orifice more than four times diameter of lobe from tip.

Male, 22 mm. long, 6 mm. wide.

Female, 25 mm. long, 7 mm. wide.

Described from 3 ♂♂, 1 ♀ as follows: 1 ♂ (type) Patagonia Mts., Ariz. (U. S. N. M.), 1 ♀ (allotype) Arizona (Chas. Schaeffer), (paratypes) 1 ♂ Ramsay Canyon, Huachuca Mts., Ariz. (W. M. Mann), 1 ♂ Arizona (Chas. Schaeffer).

Type—Cat. No. 20462, U. S. N. M.

Pyrophorus atlanticus sp. nov.(Plate III, figs. *d*, *e*.)

Sides of the prothorax parallel to beyond the middle, then broadly rounded to the apex. The posterior angles acute and divergent, pronotum slightly swollen near the base of the scutellum but not bearing a tubercle, pronotum without discal impressions. The luminous vesicles as near the lateral border as the posterior border of the posterior angles and distinctly visible from below. Color, very dark brown, vestiture short and rather sparse, not modifying the color of the integument. Elytra

¹ Since preparing this manuscript two more specimens of *P. arizonicus* have been added to the National Museum collection. These were collected on Indian Creek in the Animas Mts., New Mexico, July 23, 1917, by Dr. C. H. T. Townsend.

parallel to the middle, then attenuate to the tips, not mucronate at the tip. Antennae with joint 3 longer than 2 and distinctly shorter and narrower than 4, joints 4, 5 and 6 not twice as long as broad and strongly serrate, joint 11 simply constricted a little beyond the middle (text fig. 2 c).

Aedeagus with median lobe attenuate at tip, spatulate concave above, distance between margins of spatula, equal to diameter of lateral lobes at that point. Median orifice the diameter of median lobe, at that point, from tip. Lateral lobes attenuate from base, distal spine small declivous. No lateral spine.

Male, 12 to 17 mm. long, 3.5 mm. to 5 mm. wide.

Female, 18 mm. long, 5.5 mm. wide.

Described from 21 ♂♂ and 2 ♀♀ as follows: Type 1 ♂ Enterprise, Fla. (Hubbard & Schwarz), allotype 1 ♀ Enterprise, Fla. (Hubbard & Schwarz), paratypes 9 ♂♂ Enterprise, Fla. (Hubbard & Schwarz), 2 ♂♂ Crescent City, Fla. (Hubbard & Schwarz), 1 ♂ Eustis, Fla. (Hubbard & Schwarz), 1 ♂ North Smyrna, Fla. (Hubbard & Schwarz), 1 ♂ Welham, Fla. (S. S. White), 1 ♂ Sanford, Fla. (C. V. Riley), 1 ♂ Indian River, Fla. (Hubbard & Schwarz), 1 ♂ Florida (Hubbard & Schwarz), 1 ♀, 3 ♂♂ Florida (Chas. Schaeffer).

Type locality—Enterprise, Fla.

Type—Cat. No. 20460, U. S. N. M.

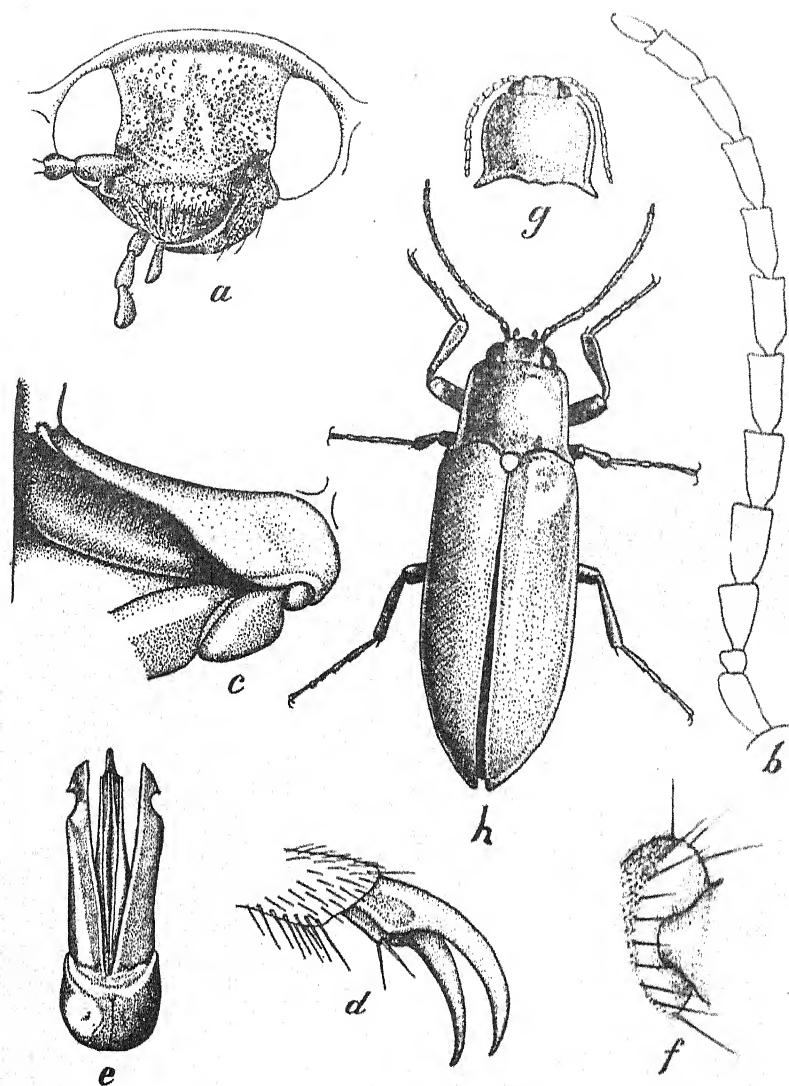
Pyrophorus texanus, sp. nov.

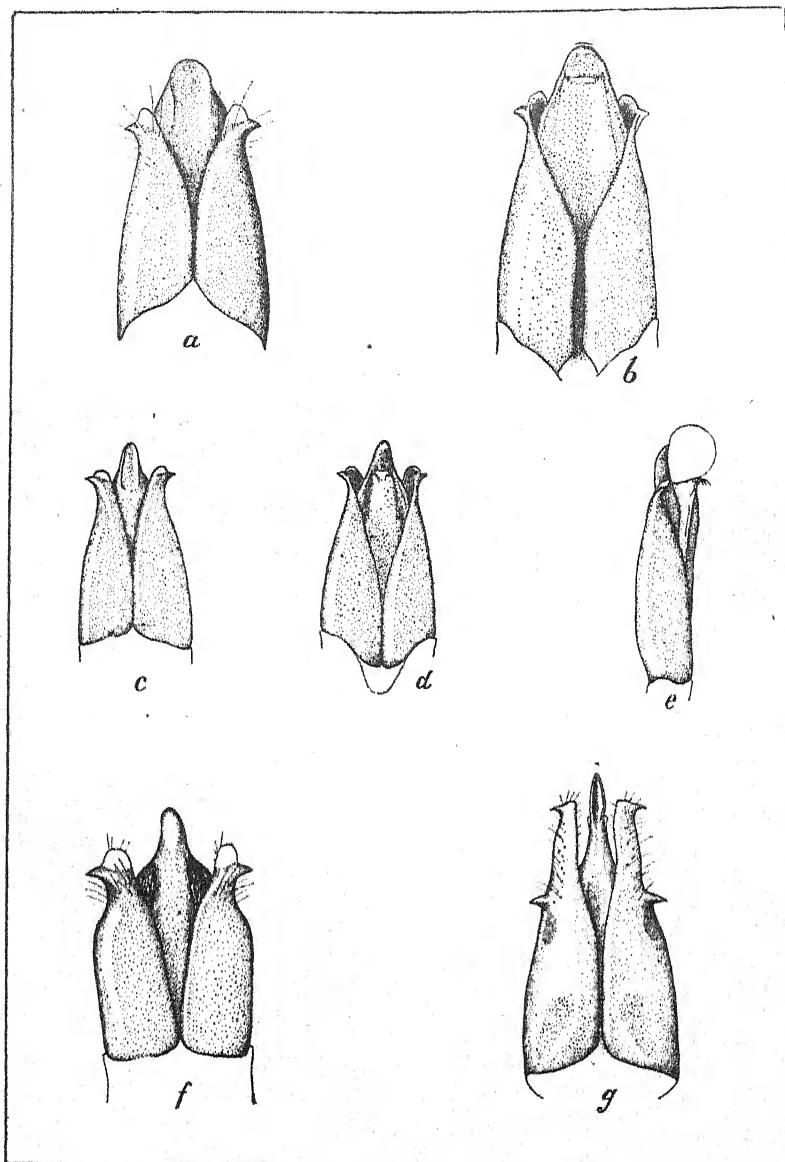
(Plate III, figs. a, b.)

Sides of the prothorax convergent from the base, slightly rounded, posterior angles acute and divergent, prominent conical tubercle on the base of the pronotum in front of the scutellum, the pronotum some times bearing impressions and some times without them. The luminous vesicles as near the lateral border as the posterior border of the posterior angles and distinctly visible from below. Color from pale reddish to almost black, the vestiture dense, grayish yellow and quite long. The elytra attenuate posteriorly and not mucronate. Antennal joint 3 longer than 2, and distinctly narrower and shorter than 4; joints 4, 5 and 6 distinctly serrate and not twice as long as broad; joint 11 simply constricted at outer third. Antennae of the male (text fig. 2 a) little, if any, longer than the pronotum.

Aedeagus with median lobe strongly narrowed at tip, declivous, convex above, median struts visible when lateral lobes are closed. Median orifice twice diameter of median lobe, at that point, from tip. Lateral lobes parallel from base to outer third then suddenly narrowed to tip. Distal spine strongly declivous; no lateral spine.

Female and male, 14 to 19 mm. long, 4 to 6 mm. wide.





Described from 43 ♂♂ and 3 ♀♀ as follows: The type 1 ♂ Brownsville, Tex. (H. S. Barber), allotype 1 ♀ Brownsville, Tex. (C. H. Townsend), paratypes 2 ♂♂ and 2 ♀♀ Victoria, Tex. (J. D. Mitchell), 1 ♂ New Braunfels, Tex. (Chas. Schaeffer), 7 ♂♂ Brownsville, Tex. (Chas. Schaeffer), 4 ♂♂ Brownsville Tex. (Townsend), 2 ♂♂ Brownsville, Tex. (H. S. Barber), 1 ♂ Columbus, Tex. (E. A. Schwarz), 4 ♂♂ Refugio, Tex. (coll. unknown), 1 ♂ San Diego, Tex. (E. A. Schwarz), 2 ♂♂ Dallas, Tex. (J. Bowl), 1 ♂ Laredo, Tex. (Hubbard & Schwarz), 1 ♂ Laredo, Tex. (A. W. Morrill), 1 ♂ San Antonio, Tex. (Hubbard & Schwarz), 3 ♂♂ Texas (John B. Smith), 5 ♂♂ Texas (C. V. Riley), 6 ♂♂ Texas (coll. unknown), 1 ♂ Texas (Chas. Schaeffer), 1 ♂ Arizona (Chas. Schaeffer).

Type locality:—Brownsville, Tex.

Type:—Cat. No. 20461, U. S. N. M.

EXPLANATION OF PLATES.

Plate I. *Perissarthron trapezium*. *a*, Anterior aspect of head of ♂; *b*, right antenna of ♂; *c*, right coxa of ♂; *d*, posterior tarsal claws of ♂; *e*, aedeagus; *f*, joint between 11th and 12th antennal segments of ♂; *g*, prothorax and head of ♀; *h*, adult ♂.

Plate II. Male genitalia of *Pyrophorus*. *a*, dorsum; *b*, ventron of *Pyrophorus physoderus*; *c*, dorsum, *d*, ventron, *e*, lateral aspect of *Pyrophorus atlanticus*; *f*, dorsum of *P. texanus*, *g*, dorsum of *P. arizonicus*.

Plate III. Adult *Pyrophorus*. *P. texanus*; *a*, male, *b*, female; *P. physoderus*, *c*, male; *P. atlanticus*, *d*, male, *e*, female; *P. arizonicus*, *f*, male, *g*, female.

NOTES AND DESCRIPTIONS OF SOME ORCHID WEEVILS.

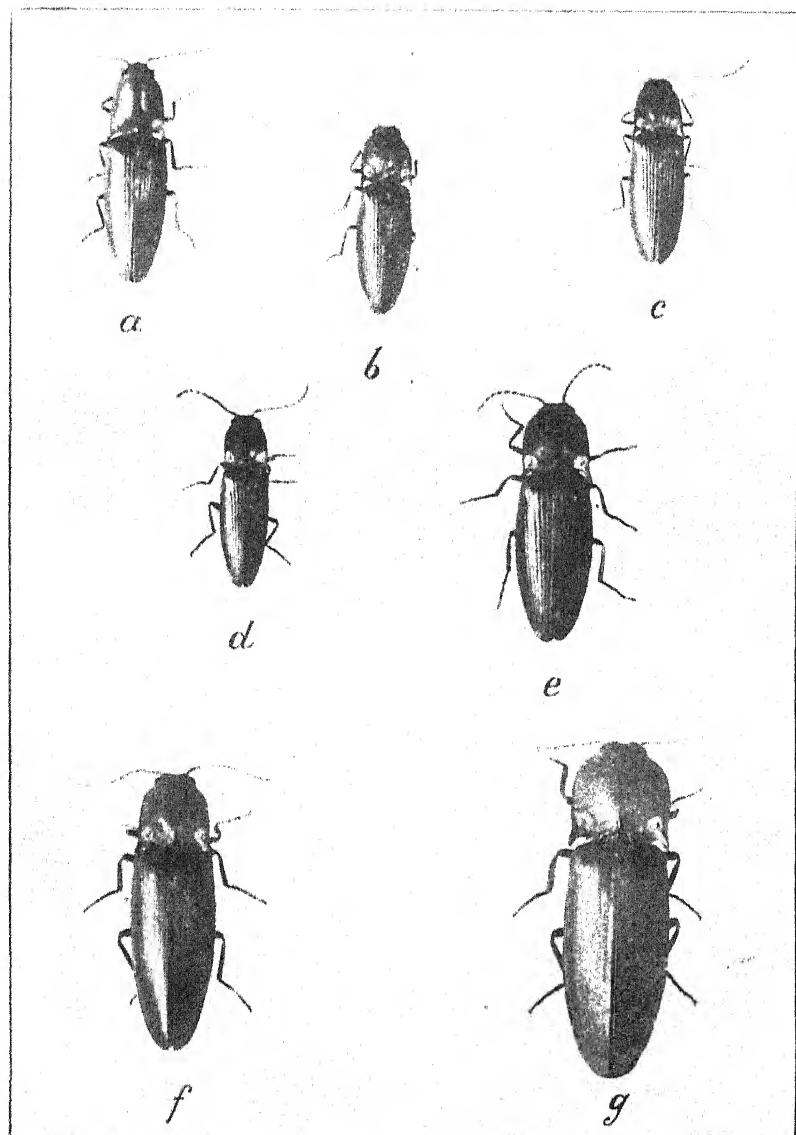
By H. S. BAUDER,

Bureau of Entomology.

The several notes on Orchid injuring insects that have appeared recently contain references to species not before reported as such and from the study of certain species in the weevil genera *Cholus*, *Acythopeus*, and *Eucactophagus*, it appears to the writer from the specimens and literature before him that certain corrections in the application of the names are necessary. Seven species are treated in this paper three of which are described as new.

Cholus Germar 1824.

Mr. Champion's description in the September number of the Entomologist's Monthly Magazine, of the large black and white orchid weevil, *Cholus cattleyae*, found by Mr. H. B. Weiss in or-



chid houses in New Jersey, came to my notice too late to withdraw my own description of the same weevil from publication in the last volume of these Proceedings and was my first intimation that the species was attracting attention elsewhere.

Mr. Weiss informs me that 17 specimens were found, usually singly on various species of *Cattleya* especially on *C. gigas* during irregular visits to an orchid house at Secaucus, N. J., between May and August of 1916. The adults were quite conspicuous, crawling and feeding on the leaves and bulbs and doing much damage. Their chief injury appears as before stated to be done by the larva developing in the pseudobulbs.

Mr. Weiss has helped me to reassemble all of his specimens except the second one he captured which he sent to Mr. Champion and which became the type of *cattleyae* being most likely now deposited in the British Museum. Five of these sixteen specimens are *Cholus cattleyae* Champ. but the other eleven examples are not that species but are *C. forbesii* Pascoe, this determination having been corroborated from photographs sent by me to Mr. Champion.

Mr. S. B. Fracker of Wisconsin writes that adults have been taken in the Milwaukee greenhouses in January, March, June, August and September and that larvae were found in all stages during this time, pupation occupying at least two but not more than four weeks and that larvae lived under the abnormal conditions of his office for at least four months without pupating. Two partly grown and two apparently full fed larvae were received alive from Mr. Fracker on September 14; the two smaller ones were here introduced into fresh, artificial holes in the healthy leaf bulbs of a small *Cattleya* where they apparently made themselves at home and excavated the interior of the bulb, but when the latter were cut open in November both larvae were found to be dead. One of the larger larvae was ready to pupate when received but was unable to cast the larval skin and was preserved September 25; the other took some weeks to prepare for pupation which it accomplished about November 1 and finally issued as an adult November 20, after which it took nearly a week to harden. It lived about two months upon a *Cattleya* plant which was finally killed by the feeding of the weevil.

Mr. Sanders recently informed me that ten or twelve specimens were preserved from the Milwaukee infestation, but of these the writer has had access to only seven. Thus including the single specimen found in Washington, D. C., in 1913, and the one reared by the writer, these notes are based upon a series of twenty-five specimens which have been assembled through courteous loans from the collections cited below, and the examination of this series is of considerable interest since the three previous de-

scriptions of the two species distinguished in the series, were based upon a total of five examples.

The idea is forced upon me that the occurrence of the two species in one orchid house in New Jersey accompanied as it is by great variation in size and in prothoracic markings in *cattleyae* (these markings always being more or less complete elements of the design which is constant in *forbesii*) and the occurrence of but one of the species (*cattleyae*) practically without variation in the Milwaukee orchid house indicate the possibility of a more or less recent hybridization under the artificial conditions, which might not be possible in their native habitats, and which may have superimposed the pronotal vestiture of *forbesii* to a varying degree upon the supposedly more dominant form and sculpture of *cattleyae*. Until some breeder can make the experiment this supposition should not receive more than casual attention but the probability of such occurrences is constantly confronting us. The native habitat of neither of the two species is definitely known.

Cholus cattleyae Champion (September, 1916)¹

In this species of which *C. cattleyarum* m. (November, 1916) is undoubtedly a synonym, the variation in vestiture consists in the appearance on an otherwise entirely black prothorax, of various of the elements of the white squamose areas so conspicuous in the following species. Of the fourteen examples before me eight specimens are from the orchid house at Milwaukee, and six of these as well as the specimen found by Mr. Heidemann in 1913, have no pronotal markings; the Milwaukee specimen reared by the writer displays a pair of postocular squamose patches, one from the New Jersey orchid house and one from that in Milwaukee have only a small prescutellar spot as described by Champion; one specimen (in Dickerson collection, received from Weiss) displays the prescutellar spot, the pair of postocular spots and also a pair of small discal squamose areas; the prescutellar spot and only one of each of the discal and postocular spots are present in another specimen in the Weiss collection, and only the prescutellar and one of the postocular spots in the specimen Mr. Weiss gave to Mr. Leng; finally a specimen received by the American Museum of Natural History (the first one found by Mr. Weiss and the one which he illustrated, Entomological News) which has two pairs of squamose areas in addition to those just mentioned, one before the humerus, and another above the coxae, all being connected with the prosternal squa-

¹ See Proc. Ent. Soc. Wash., XVIII, Plate XIII, facing p. 178.

mose band, as shown in the figure (Pl. 4, fig. 2). The elytral vestiture is more constant, but in the Washington specimen the white areas although maintaining their position are so reduced in size that the intervening black lines of the striae become obvious and the specimen has a much more tessellate appearance. Six of the Milwaukee specimens are females and measure 10.75 mm. to 12 mm. while the single male measures 10.25 mm. in length (excl. rostr.). The five Weiss specimens measure 8.5 mm. (σ^1 and φ) 9.5 mm. (σ^1), and 10.5 mm. (σ^1 and φ). The specimens belong in the following cabinets:

U. S. National Museum,—4 specimens (type and paratype of *cattleyarum* Bar. and two other specimens from Milwaukee).

Wisconsin Department of Agriculture,—4 specimens (from Milwaukee).

University of Wisconsin,—1 specimen (from Milwaukee).

American Museum of Natural History,—1 specimen (from Weiss).

Mr. Chas. Leng,—1 specimen (from Weiss).

Mr. E. L. Dickerson,—1 specimen (from Weiss).

Mr. H. B. Weiss,—2 specimens.

***Cholus forbesii* Pascoe 1877. (Pl. 4, figs. 1, 1A, 1B.)**

The specimens in our series are narrower and less roughly sculptured than *cattleiae*, with the tibial and tarsal vestiture composed of intermixed black and white hairs instead of yellow ones. There are no white scales on the mesopleural plates and the specimens display a different series of elytral and prothoracic squamose markings which vary slightly but in general leave, large, black unclothed areas as follows:—A large elongate discal black spot occupying nearly half the length of the suture, and often with lateral extensions near its posterior end; a large three-lobed, discal black spot on the pronotum which encroaches slightly on the elytral base on each side of scutellum and is usually narrowly produced anteriorly to join the black head;¹ a pair of post-lufinal round spots of about the same size as one of the lobes of the pronotal macula; a pair of subapical lateral spots apparently the same size in the dorsal aspect but produced downward and forward to include the posterior coxae; and finally the

¹ Mr. Champion writes that in the type the white scales of the pronotum are more extended partly enclosing three bare patches on the disc, and from a rough diagram accompanying this statement it appears that the prescutellar squamose patch is produced forward and joins with inward extensions of the transverse squamous band at basal third of pronotum, leaving the anterior nude area triangular and the basal pair quadrate.

short common, apical elytral black spot. In addition to these there is a small lateral, prehumeral spot on the thorax, usually encroaching a little onto the base of the elytra and sometimes connected with the discal spot; in front of it are two small lateral spots of which the lower is very small but present in all specimens. The metasternum is clothed with white scales as in *cattleyae* and the abdominal sternites are similarly clothed, except that the patches on the second segment fuse into a continuous transverse band.

The eleven specimens (5 ♂♂, 6 ♀♀) before the writer (and six specimens of *cattleyae*) were all taken by Mr. Weiss in an orchid house at Secaucus, N. J., during the past summer, and have generously been loaned (except of course the type in the British Museum) from the following collections:

Mr. H. B. Weiss,—7 specimens labelled "Bergen Co., N. J.," two of which are retained for the National Collection, by the kind permission of the owner.

Mr. E. L. Dickerson,—2 examples labelled "Secaucus, N. J., VIII."

Mr. A. C. Frost,—1 example.

American Museum of Natural History,—1 example.

The notices of these orchid *Choli* known to me are as follows:

1877 Pascoe (Proc. Ent. Soc., Lond., 1876, p. XXX, named and gave short diagnosis of *Cholus forbesii* from a specimen found among some supposedly Ecuadorian orchids at Highgate, England.

1903 Champion (Biol. Centr.-Amer. Colloq., vol. IV, pt. 4, p. 306, pl. XVI, figures 12 and 13) describes and figures two new species, *C. nigronotatus* from Nicaragua and Panama (two specimens), and *C. nigromaculatus* from Panama (a pair) the first of which he compares with Pascoe's species.

1906 Champion (i.e., p. 724—footnote) corrects an error in above.

1916 Champion (Ent. Mo. Mag. (3), vol. 2, Sept., p. 201) describes a new species. *C. cattleyae* from a specimen found by Mr. Weiss breeding in bulbs of *Cattleya gigas* in a New Jersey greenhouse. A photo of the same species from Milwaukee, Wis., is cited and the three preceding species are mentioned.

1916 Barber (Proc. Ent. Soc. Wash., vol. 18, p. 177, pl. 13) figures and describes the Milwaukee specimen as *C. cattleyarum*.

1916 Fracker (Wisconsin Horticulture, vol. 7, Oct., p. 27) records the occurrence of *Cholus cattleyae* (without using a name) in orchid houses in Milwaukee.

1917 Weiss (Ent. News, vol. 28, p. 28, pl. V, fig. 2) describes the injury in greenhouses by *C. cattleyae* and *C. forbesii* and figures the specimen of the former species now preserved in the American Museum of Natural History.

1917 Sanders and Fracker (Wis. Dept. Agric. Bull. 10, pp. 54-56, fig. 15) report their observations on *Cholus cattleyae* in Wisconsin.

1917 Weiss (Ent. News, vol. 28, p. 218) lists *Cholus cattleyae* and *C. forbesii* from New Jersey.

Acythopeus Paseoe 1874.

This genus was erected for a group of small barids having the rostrum greatly enlarged anteriorly at base and separated from the front by a deep transverse incision. The three species here referred to do not display this character but I am unable to place them among more agreeable companions and expect their segregation as new genera may become necessary. No recent allusion to *Centrinus epidendri* Murray? 1869 which was believed to have been bred from orchids, or to *Apotomorhinus orchidearum* Kolbe 1906 (which appears to be closely allied to, or synonymous with *Acythopeus aterrimus* Waterhouse 1874) has been found but I cannot now ascertain if they are in reality allied to the specimens before me.

Acythopeus gilvonotatus n. sp. (Pl. 4, figs. 3, 3A)

Type—Cat. No. 21067, U. S. National Museum.

Piceous, the humeri and legs paler; opaque strongly alutaceous; coarsely foveolately punctate; elytra ornamented with a double posthumeral and two subbasal, discal, convex masses of yellow scales; femora unarmed. Head with front feebly impressed between the eyes which are separated by the width of the beak; front shallowly foveolate, each impression with a small silvery scale at center. Beak (from frontal impression) two-fifths as long as length of specimens, only slightly more curved in basal half than apically where it is slightly flattened, broader, and finely punctate; punctures almost contiguous at middle of upper surface, becoming longitudinally confluent at sides, forming a conspicuous sulcus above the serobes with a secondary imperfect sulcus separated from it by broken irregular carinae, the individual punctures being only distinguished by the silvery scale of each. Antennal scape almost reaching the eye, distant from it by about one-third the length of the first funicular joint; first of the seven joints of funicle as long as two of the following joints which gradually increase in width until the seventh is twice as wide as the second; club elongate oval, as long as the three preceding joints and a little wider than the seventh. Pronotum seven-eighths (♀) to nine-tenths (♂) as long as wide, widest at middle, sides straight and feebly convergent posteriorly, arcuately convergent anteriorly, surface strongly alutaceous between the coarse, rather closely set squamiferous fovea. Elytra five-eighths to two-thirds as wide as long, widest just behind humeri, sides almost parallel in basal half; striae deeply confluent punctate at base, the punctures more shallow and widely separated on the

dise; intervals flat with a median row of fine squamiferous punctures, the second, fourth, sixth and eighth intervals broader than their alternates and bearing two or three large scales, most of the punctures bearing only minute scales; second interval clothed at basal fourth with a small oval prominent mass of dense yellowish scales, fourth interval with a larger mass of similar scales which nearly reaches the base of the elytra, sixth and eighth intervals with similar but smaller masses, a little posterior to the others and almost uniting over the much constricted seventh interval. Legs sparsely clothed with silvery scales each of which is set in a shallow fovea, the femora relatively stout and unarmed, the tibiae with inner edge straight and apex strongly hooked. Length 3 to 3.6 mm., width 1.3 to 1.6 mm.

Habitat unknown.—(probably Philippine Islands).

Described from two specimens (σ and φ) found among Philippine orchids in the Executive greenhouses, Washington, D. C., in November, 1906, and one (σ) found on *Phalaenopsis* in a greenhouse in Bergen County, N. J., by Mr. H. B. Weiss in 1916.

This species does not belong in *Apotomorhinus* Schoenherr 1844 nor in *Acythopeus* Pascoe 1874, both of which have a frontal incision at the base of the rostrum, and differs from *A. aterrimus* (Waterhouse) 1874 and from *A. orchivora* (Blackb. 1900) in the unarmed femora, straight tibiae, as well as in sculpture and vestiture, but since Champion 1913 and 1916 includes these latter species in this genus "for the present" the species here described may as well also be assigned here. The writer hopes the two species *aterrimus* and *orchivora* are correctly determined in the material before him but is unable from the literature to satisfy himself on this point. Yet, since the species appear to have never been contrasted, though several times compared, he offers the following vague characters of habitus which may aid in their recognition.

A. orchivora (judging from three specimens received under this name from H. B. Weiss from the same set as the specimen mentioned by Champion 1916) is smaller, more robust, darker colored (piccus black) and more shining (owing to slightly larger and more prominent polished rugosities on the outer margin of the pronotal punctures and on the anterior margin of the interstrial series of minute elytral punctures) and has the humeri slightly more prominent with basal end of eighth stria more deeply impressed. Length 2.7 (φ), 3 (σ) and 3.3 (σ) mm.

A. aterrimus is larger, more elongate, rufopiceous and less shining, the pronotal punctures deeper and relatively more close-set, punctures of eighth stria moderately impressed, interstrial series of polished rugosities relatively finer and all the striae relatively broader. Three specimens found on Philippine orchids in the

Executive greenhouses in 1906 were determined as this species some years ago by Mr. E. A. Schwarz and measure 3.2 (♀), 4 (♀) and 4.1 (♂) mm.

A summary of the papers encountered by the writer in this investigation which may prove useful in its continuance by others is appended, but he has included the 1844, 1859, 1866, and 1874 citations only because of possible systematic usefulness, since no relationship of these weevils with orchids is indicated in them:

1844 Schoenherr (Gen. et Sp. Curelioniidum, vol. 8, p. 258) erects the genus *Apotomorhinus* (type *A. submaculatus*).

1844 Boheman (in Schoenherr, i.e., pp. 259-260) describes *Apotomorhinus submaculatus* and *cribratus* n. spp. from Manilla and Pondicherry.

1859 Walker (An. Nat. Hist. (3), vol. III, p. 264) describes *Apotomorhinus albo-ater* n. sp. and *A. signatus* n. sp. from Ceylon.

1866 Lacordaire (Gen. Coleop., vol. 7, pp. 226-7) redescribes *Apotomorhinus* Schoenh. correcting the number of funicular joints from 8 to 7 and citing the two species of Walker 1859 as apparently not belonging to this genus.

1869 Murray? (Gardner's Chronicle, 1869, p. 1279) describes *Centrinus epidendri* (apparently a new species) believed to attack soft-hearted orchids such as *Epidendrum*. (See remarks by Rye in Zool. Record, vol. 6, pp. 280-281.)

1874 Pascoe (Journ. Linn. Soc. Zool., vol. 12, Feb., pp. 61-63) describes a new genus *Acythopeus* containing five new species, two of which are figured (pl. 3, figs. 11, 11 a and 17).

1874 Waterhouse (Ent. Mo. Mag., vol. 10, March, p. 226) describes *Baridius aterrimus* n. sp. from Singapore, where it was "destructive to *Phalaenopsis* and other orchids," and believes the species should enter Pascoe's just published genus *Acythopeus*.

1900 Blackburn (Trans. R. Soc. S. Austral., vol. 24, pt. 2, p. 61) describes *Baris orchivora* n. sp. bred from stems of a Queensland orchid (*Dendrobium* sp.) at Sidney (Froggatt).

1904 Froggatt (Agr. Gazette, N. S. W., vol. 15, p. 517, and plate facing p. 514, fig. 2) notes the infestation of the pseudo-bulbs of *Dendrobium* from which he had taken the specimens described as *Baris orchivora* by Blackburn 1900. The work, larva, pupa and adult are described briefly and the adult is figured.

1906 Kolbe (Gartenflora, vol. 55, pp. 2-6) describes *Apotomorhinus orchidearum* n. sp. from cultivated orchids (*Phalaenopsis*) believed to come from the Malayan Islands but makes no allusion to earlier papers.

1906 Lea (Trans. R. Soc. South Austral., vol. 30, p. 101) compares a specimen of *aterrimus* received from Waterhouse with what he believed to be *orchivora* and reported them undoubtedly identical. The assignment to the genus *Acythopeus* is strongly criticized but

he did not feel justified in proposing a new generic name for the species.

1912 Swezey (Proc. Hawaiian Ent. Soc., vol. II, no. 4, p. 168) notes *A. aterrimus* as established in an Orchid house in Honolulu and also as taken from orchids imported from Manila, citing Froggatt's 1904 illustration and alluding to Lea's 1906 synonymy.

1913 Champion (Ent. Mo. Mag. (2), vol. XXIV, p. 33) records the capture of *Baridius aterrimus* in a flower of *Catasetum splendens* at Kew and cites specimens from other English conservatories. The species is assigned for the present to *Acythopeus* Pasc. but differs in having toothed instead of unarmed femora and the intermediate tibiae toothed in the ♂. Froggatt's (?) statement that *B. orchivora* Blackb. is a synonym is denied but the two species are said to be closely allied.

1916 Champion (Ent. Mo. Mag. (3), vol. II, p. 200) cites *Baridius orchivora* as found on flowers of *Dendrobium* in New Jersey by Mr. Weiss and assigns this species with *Baridius aterrimus* whose food records he reviews, to the genus *Acythopeus* Pasc. (typ. err. for *Acythopeus*). *Diorymellus laevimargo* n. sp. is described from specimens received from H. B. Weiss in New Jersey and from a specimen found attacking orchid roots in a greenhouse at Ithaca, N. Y.

1917 Weiss (Ent. News, vol. 28, pp. 26-28, pl. 5, figs. 3 and 4) reviews the accounts by Blackburn, 1900, and Froggatt, 1904, of *Acythopeus orchivora* and records its frequent occurrence and injury in orchid houses in New Jersey. The abundant occurrence of *Diorymellus laevimargo* and the injury by the adults is described and the adults of both weevils are figured.

1917 Weiss (Ent. News, vol. 28, p. 106) corrects *Acyphocetus* to *Acythopeus*.

1917 Weiss (Ent. News, vol. 28, p. 218) again cites *Diorymellus laevimargo* and *Acythopeus orchivora*, as found in New Jersey.

***Eucactophagus* Champ. 1910.**

Five species of this genus are in the National Collection, two of which appear to be new and are here described. The other three were determined by Mr. Champion and are mentioned in his 1910 work (Biol. Centr.-Amer., Coleop. vol. IV, pt. 7, pp. 96-100, pl. IV, figs. 31-35a, and pl. V, figs. 1-3a). The genus does not appear homogeneous and the species may not all be orchid feeders but as two species have now been taken in American greenhouses with the inference that they issued from imported Orchids, we may expect other species to appear also. The six species included in the Biologia are all well figured and the seventh species, the genotype, is illustrated with its original description. Photos of two new species are here given although a drawing of one of them has been published by Weiss 1917.

Eucactophagus graphipterus Champion 1910.

As stated in a footnote to the description of this species, Champion's third specimen was found in a greenhouse in Connecticut by Dr. Britton and is in our National Collection. I have seen no other specimen but the type and paratype localities are Costa Rica and Colombia. The large yellow area of the elytra covers the basal two-thirds and bears a round brown spot at middle of suture which reaches the third stria, a pair of similar spots just behind middle extending from fifth stria to margin and a faintly rufous area at basal fourth between third and fourth striae. The identification of the form treated by Weiss 1917 as this species was made by Mr. Schwarz about 1914, from a single specimen which he then supposed was only a variant of *graphipterus* but a series of specimens subsequently taken in the New Jersey orchid houses and received from Mr. Weiss vary but little among themselves and are conspicuously distinct from Champion's species. Since I have failed to find a description with which it agrees it becomes necessary to propose a new name for the species that has troubled the New Jersey orchid growers.

Eucactophagus weissi n. sp. Pl. 4, figs. 4A, 4B.

E. graphipterus Weiss 1916 (Journ. N. Y. Ent. Soc., xxiv, pp. 93 and 147), 1917. (Ent. News, vol. 28, pl. 5, fig. 1) nec. Champion.
Type—Cat. No. 21068, U. S. N. M.

Very similar to *graphipterus* apparently differing from it only in the elytral coloration, deeper elytral striae and in the pygidium being slightly more strongly carinate with coarser punctures. The elytra are principally translucent yellow in color, the suture, base, and posthumeral third of side margin narrowly margined with black, the black margin becoming broad on the humerus and side margin behind the middle, and occupying the apical fourth of the elytra. The striae are more deeply engraved with larger and deeper punctures which show the black ground color through the yellow chiton; interstices more convex and clear yellow except for rufous or piceous spots situated as follows: second interval with a piceous area twice as long as wide at middle of length of elytra, third and fifth interval with a similar spot at basal fourth which sometimes merge into one but both are sometimes very pale, the fifth also has a second black or brown spot just behind the middle. The yellow coloring is produced a little further backward in intervals 2, 4 and 6. Length 13-17 mm., width 5.5-7.5 mm.

Habitat unknown (probably tropical America).

Described from five specimens 2 ♂♂, 3 ♀♀, taken in orchid houses at Summit, N. J., by Mr. H. B. Weiss, the type dated April 27, 1914, paratypes in the collections of Mr. Weiss and Mr. Chas. Leng.

Eucactophagus biocellatus n. sp. (Pl. 4, fig. 5.)

Type:—Cat. No. 21069, U. S. N. M.

Very similar to *E. aurocinctus* Champ. but conspicuously different in that the yellow area occupies the basal three-fourths of the elytra except the humerus and encloses a piceous macula occupying third, fourth and fifth interstices just before middle of elytra. The striae punctures are more deeply impressed and the interstices more convex than in *aurocinctus*. The first stria is areuate basally and joins the second stria beside the scutellum. The third interstice is twice as wide at base as the fourth, the seventh interstice but little more than half as wide throughout its length as the others. The antennal scape is stouter basally and less swollen apically, and is feebly areuate in basal half. Length 10 mm., width 4.8 mm.

Described from a single specimen received about 1912 from F. H. Jackson at Las Caseades, Canal Zone, Panama. The black discal elytral spots occupy part of the area occupied by the yellow fascia in the cotype of *aurocinctus* illustrated by Champion which is before me (U. S. Nat. Mus. Cotype No. 21070), so it is improbable that it might be merely a form of that species with the yellow fascia more extended.

EXPLANATION OF PLATE IV.

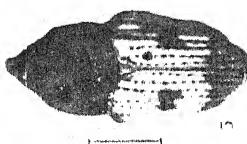
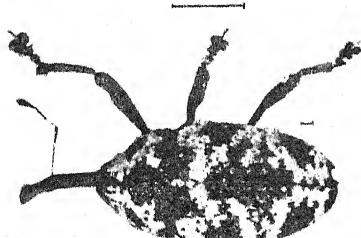
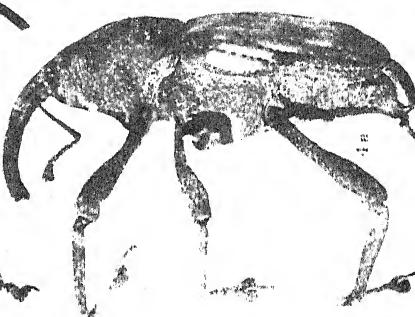
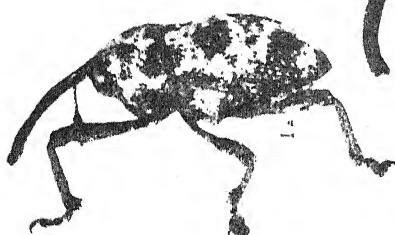
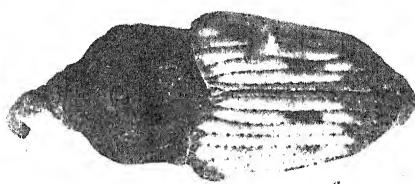
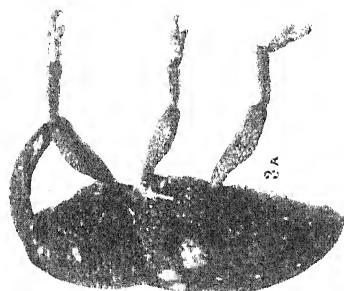
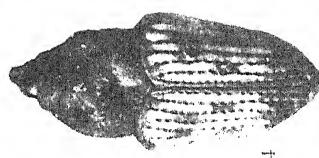
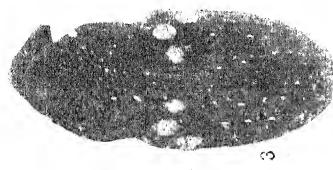
- 1, 1A, 1B. *Cholus forbesii* Pascoe.
2. *Cholus catteleyae* Champ. Abnormal specimen (perhaps hybrid) in collection of Amer. Mus. Nat. Hist., displaying thoracic vestiture as in *C. forbesii*. For normal coloration see plate facing p. 178, Proc. Ent. Soc. Wash. 1916.
- 3, 3A. *Acythopeus gilvonotatus* n. sp. Type. (Photo. by Paine.)
4. *Eucactophagus weissi* n. sp. Type.
- 4A, 4B. " " Largest paratype. (Dark lines on abdomen and metasternum of 4B are shadows of legs.)
5. *Eucactophagus biocellatus* n. sp. Type.

THREE NEW TACHINID PARASITES OF ELEODES.

By W. R. WALTON,

Bureau of Entomology, U. S. Department of Agriculture.

The three forms described below constitute an addition to our knowledge of the dipterous parasites of the imagines in Coleoptera. Two of them represent a well marked genus, apparently new to science. The remaining form is a true *Biomyia*, a genus already known as being parasitic on adult beetles. The American species



known to have this habit are *Biomyia georgiae* B. and B., and *B. lachnostenae* Town., *Euhalidaya* (*Biomyia*) *genalis* Coq., described by me as *E. severini*, and parasitic on *Diapheromera* (Orthoptera) is of course not a *Biomyia* in any sense but represents, in my opinion, a valid genus very close to *Halidaya* of Egger.

Eleodiphaga new genus.

Moderately robust, head (pl. 5, fig. 1) large, wider than thorax, distinctly conical, much thicker at insertion of antennae than at vibrissae. Wings rather short, legs robust.

Front abruptly produced, antennae inserted distinctly above the middle of eye, face sloping downward in a gentle convex curve to vibrissae which are inserted slightly below the oral margin. Cheeks equal in width to at least two-thirds height of eye. Front at vertex nearly twice as wide as eye, the vitta occupying one-third or more of its width. The frontalia thickly sprinkled with macrochaetae. Parafacials more than half as wide as facial depression, their lower half plentifully sprinkled with irregularly arranged bristles. Facial depression deep, its sides almost parallel, carina nearly obsolete. Fasecialia bearing bristles on approximately the lower two-thirds. Antennae, in the male, very long, first two segments elevated above the level of the front, third segment slightly longer than the face, its long sides nearly parallel, at least six times longer than broad and of a velvety texture. Arista inserted at extreme base of third segment and thickened to its tip, second joint only slightly longer than broad. Vibrissae short, rather weak, not decussate, and directed downward. "Transverse depression" of face not transverse but running almost vertically from corner of eye to oral margin, the cheeks proper merging immediately with inferior occipital surface. Eyes absolutely bare, small and oval in shape. Frontal macrochaetae arranged in two rows, the upper ones not noticeably stronger than the lower, descending well below insertion of arista. No true orbita present in male. Ocellar bristles well developed and widely divergent but directed forward. Ocellar triangle unusually large. Proboscis very short; fleshy; palpi, normal. Wings (pl. 5, fig. 2) with the apical cell long-petiolate, ending in the costa, well before tip of wing, the petiole about twice as long as small crossvein. Costal spine obsolete but distinguishable. All veins bare excepting base of the third which bears two or three ordinary bristles. Front claws of male not elongated, the hind tibiae coarsely pectinate but not ciliate, with coarse bristles. The tarsi all rather small and weak.

This genus seems to be related to both *Phasmophaga*, Town., and *Hyperecteina* (Admontia) Schiner.

Type of the genus, *E. caffreyi* new species.

Eleodiphaga caffreyi new species.

Length 9 mm. male. Black, subshining; wings milky, nearly opaque; veins black. Front, face, cheeks and occiput black, thinly pruinose, with grayish pollen. Vitta brownish. Antennae and arista black, palpi reddish. Postocellar pair of macrochaetae present. Thorax black, thinly grayish pollinose, two pairs of indistinct vittae present, postsutural dorsocentral bristles three, sternopleurals four or more, pleurae black, thinly whitish pruinose. Scutellum black, bearing three pairs of marginals and an apical pair. Abdomen ovate, conical, black, shining, entirely destitute of pollen or spots. Median discal and marginal macrochaetae on all segments excepting the first which bears neither. Venter black, hypopygium retracted but visible, shining black. Middle tibiae bearing one weak and two strong macrochaetae on front side toward the middle. Legs black including coxae, squamae opaque white.

Described from two male specimens, one reared from material collected by D. J. Caffrey of the U. S. Bureau of Entomology, at Maxwell, New Mexico, (elevation 6,500 feet) and in honor of whom the species is named. The specimen emerged from an adult of *Eleodes extricata* Say. The other specimen was reared from material collected by V. L. Wildermuth, at Prescott, Arizona, and emerged from an adult of *Eleodes obsoleta*, Say.

Eleodiphaga pollinosa new species.

Length 9 mm. Similar structurally to the foregoing species, differing as follows: slightly more robust, the front (pl. 5, figs. 3-4) produced not quite so much, eyes longer, antennae somewhat more slender, arista a little shorter. The palpi yellow and rather small. First two joints of antennae yellowish red, third joint brownish, entire head more thickly pollinose. Thorax and scutellum opaque, whitish pollinose, five dorsal vittae plainly visible, the middle one obsolete cephalad of the transverse suture.

Dorsocentral macrochaetae four, aerostichals strong and in four pairs, sternopleurals four or more. Abdomen robust, ovate, first three segments black, the basal two-thirds silvery pollinose, the margins shining, fourth segment orange yellow, thinly silvery pollinose at base. First segment without median macrochaetae, the intermediate segments with weak discals and marginals, fourth segment bearing only weak bristles on its disc and the marginals also rather weak. Legs black, claws short, hind tibiae subciliate, middle tibiae bearing a single macrochaeta on front side near the middle. Wings milky hyaline, veins blackish, third vein bearing three weak bristles at its base. Tip of both wings broken off in holotype about opposite the hind crossvein, remains of wings very similar to *E. caffreyi*.

Described from a single male specimen reared from an adult of *Eleodes hispilabrus* Say, collected at Maxwell, New Mexico, by D. J. Caffrey.

Biomyia eleodivora new species.

Length 10 mm., male, slightly elongate in form, ashy gray opaque, wings fuscous-hyaline. Head (pl. 5, fig. 5) of the true *Biomyia* form. Antennae inserted slightly above middle of eyes. Front sloping upward from root of antennae to vertex, is about one-half as wide as width of eye. Vitta occupying approximately one-half of front, black in color.

Parafacials, parafrontals, occipital border and facial depression silvery gray pollinose. Frontals descending to tip of second antennal joint, orbital bristles absent. Antennae dark brown, very slender, the third joint a little more than twice as long as the second. Arista longer than antennae, very slender, thickened only at extreme base. Palpi and proboscis reddish. Vibrissae long, slender and projecting at right angles to plane of face, inserted well above oral margin. Cheeks ashy gray covered with rows of fine black hairs. Thorax and scutellum rather thinly ashy gray pollinose. Five vittae visible, the middle one obsolete cephalad of the transverse suture. Posterior dorsocentrals four; they are unusually long and slender and nearly erect. Acrostichals in three pairs. Sternopleurals three, pleurac thinly cinereous pollinose. Abdomen entirely opaque, rather thinly cinereous pollinose and slightly marmorate. A distinctly median, blackish vitta visible from behind. Venter concolorous with abdominal dorsum. Hypopygium visible, black and bearing a few fine hairs. All segments of abdomen bearing median marginals, no true discells apparent on any segment. Legs remarkably robust, black, all, and especially the hind metatarsi, noticeably swollen (figs. 7 and 8). Hind tibiae not ciliate nor pectinate but bearing a few scattered macrochaetae. Front claws elongated. Wings (pl. 5, fig. 6) slightly fuscous, the veins brownish. Squamae white.

Described from one male specimen reared from an adult of *Eleodes tricostata* Say, collected by J. S. Wade, at Holdredge, Nebraska. The species is closely related to *B. lachnosternae* Town., but is evidently quite distinct.

EXPLANATION OF PLATE V.

Eleodiphaga caffreyi.

Fig. 1. Head of male.

Fig. 2. Wing of male.

Eleodiphaga pollinosa.

Fig. 3. Side view of head.

Fig. 4. Front view of head.

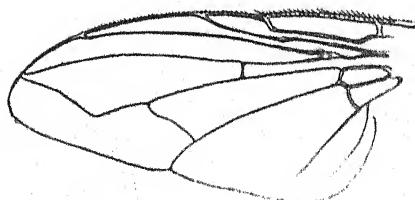
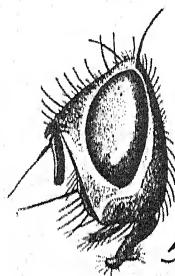
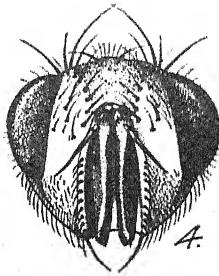
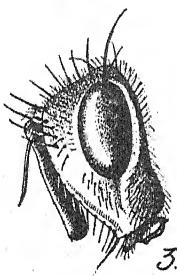
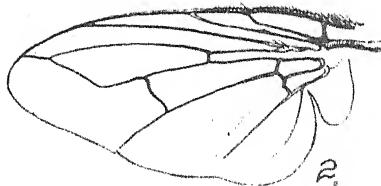
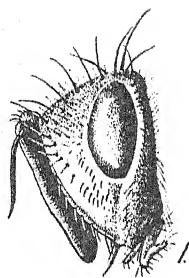
Biomyia eleodivora.

Fig. 5. Side view of head.

Fig. 6. Wing.

Fig. 7. Hind tibia and tarsus, dorsal view.

Fig. 8. Lateral view of hind tarsus, showing spiny armament of ventral surface.



TWO HUNDRED AND NINETY-NINTH MEETING,
DECEMBER 7, 1916.

The 299th regular meeting of the Entomological Society of Washington was entertained by Dr. W. D. Hunter at the Saengerbund Hall, December 7, 1916. There were present Messrs. Baker, Busek, Cole, Crawford, Cushman, Ely, Gahan, Garman, Gibson, Greene, Heinrich, Hunter, Hyslop, Kotinsky, Middleton, Morrison, Paine, Pierce, Rohwer, Sascer, Schwartz, Snyder, Speare and Walton, members, and Messrs. J. J. Davis, Harry F. Dietz, R. M. Fouts, F. H. Gates, visitors.

The president announced the death on November 17 of Mr. Otto Heidemann, a valued member and ex-president of our Society. He also stated that he had appointed Messrs. Schwarz, Howard and Busek a committee to draw up suitable resolutions.

Mr. Schwarz gave some exceedingly interesting reminiscences of Mr. Heidemann's early life as an entomologist and member of the Society. Mr. Rohwer told something of Mr. Heidemann's connection with the Society, stating that he had designed the cut of the official seal of the Society. Mr. Rohwer stated that he had received resolutions of condolence from the Cambridge Entomological Society.

Mr. Busek also gave some interesting reminiscences of Mr. Heidemann's private life.

Messrs. E. H. Gibson and F. R. Cole of the Bureau of Entomology, and Dr. Philip Garman of the Maryland Agricultural College were elected to active membership.

The following officers were elected:

President, C. R. Ely.

First Vice-President, E. R. Sascer.

Second Vice-President, Frederick Knab.

Secretary-Treasurer, S. A. Rohwer.

Recording Secretary, A. B. Gahan.

Editor, J. C. Crawford.

For members of the Executive Committee, Messrs. W. D. Hunter, A. L. Quaintance, and A. N. Caudell.

Mr. Hunter was nominated to represent the Society as a vice-president of the Washington Academy of Sciences.

Under the head of "Notes and Exhibition of Specimens" the following was presented:

NOTES ON THE IMMATURE STAGES OF HEMITAXONUS
MULTICINCTUS ROHWER.¹

BY W. B. HALL.

The following observations were made from material collected on a cultivated fern bed in Wakeman, Ohio. The ferns in this bed were transplanted from their native haunt which is on the banks of the Vermillion River, near Wakeman, Ohio.

From certain upchecked tests it seems that this species can be only partially controlled by hellebore.

Host.—*Athyrium thelypteroides* (Michx.) Desv.

Egg.—The eggs are attached on end to the upper side of the leaf, often as many as ten or twelve on a frond. They are smooth, shining, honey-yellow, about 1 mm. long by 0.5 mm. broad. Before hatching the young larva can be observed through the transparent egg shell. Incubation varies from 50 to 60 hours.

Oviposition.—From observations in 1914 it appears that oviposition occurs about May 22.

Larva.—Light green with black spots on the head and a light line along each side of the body. On hatching it is about 2 mm. long and when through feeding, about 10 mm., long. In the rearing cages the feeding stage is 11 to 12 days. [The last feeding stage larvae preserved alcohol have a large brownish spot on the anal plate, the vertex, occiput and front medially brownish, and a blackish spot behind the eye. They correspond closely with the larva of *dubitatus* var. *amicus* as described by Dyar.] There is only one generation a year.

Natural enemies.—The House Wren (*Troglodytes domesticus*) feeds on the larva. It was interesting to watch a pair of wrens, which had their young in a bird house near by, carry the larva to their young. They would dart in among the fronds, catch their prey, and fly away to their nest. One female made 5 trips in 3 minutes.

[In the same vial with larvae is a single Dipterous puparium indicating that this species is parasitized by some fly.]

¹ Remarks enclosed in brackets have been supplied by Mr. S. A. Rohwer.

THREE HUNDREDTH MEETING,

JANUARY 4, 1917

The 300th regular meeting of the Society was entertained by Mr. E. A. Schwarz at the Saengerbund Hall, January 4, 1917. There were present Messrs. Ainslie, Back, Baker, Böving, Buseck, Caudell, Cole, Cushman, Dietz, Duckett, Ely, Fink, Gahan, Garman, Gibson, Gill, Greene, Heinrich, Howard, Hunter, Hutchison, Isely, Johansen, Kelly, Kotinsky, Marlatt, Middleton, Morrison, Pierce, Popenoe, Ransom, Rohwer, Sanford, Sascer, Schwarz, Simanton, Snyder, Turner, Walton, and White, members, and K. B. Brown, J. A. Coreoran, W. E. Dove, Henry Fox, Seymour Hadwen, Leale F. Howard, H. G. Ingerson, U. C. Loftus, visitors.

Mr. James C. Evenden, Bureau of Entomology was elected a corresponding member.

Mr. J. S. Wade, of the Bureau of Entomology, and Mr. Harry F. Dietz, of the Federal Horticultural Board, were elected active members.

The chair announced the death January 2, 1917, of Mr. John F. Strauss, a member of the Society.

The following program was presented:

A REVISION OF THE NORTH AMERICAN GRACILARIIDAE FROM
THE STANDPOINT OF VENATION.

BY C. R. ELY.

The writer has for some time been interested in the genus *Gracilaria* and its allies. The appearance of Meyrick's Revision of the Gracilaridae was therefore very welcome. It was a matter of some surprise that, in this revision, the character of the vestiture of the legs was made of chief importance in delimiting genera and that less emphasis than usual was placed upon venation. It is not intended, in this paper, to combat the deliberate opinion of Mr. Meyrick, in regard to what character is of most importance within this family, but it is believed that the publication of a classification of our North American forms, from the standpoint of venation, may be made to serve a useful purpose,

in calling attention to certain facts concerning the species of a geographically restricted group. For the study of the Gracillariidae along broader lines Meyrick's comprehensive work must be consulted.

The careful study of wing venation requires the complete denudation of the wings and it is therefore evident that unique types could not always be satisfactorily examined. In the following article all such exceptional cases will be noted.

The general characters of the Gracillariidae, so far as the venation is concerned, are given by Meyrick as follows: "Forewings lanceolate or very narrowly elongate; 1 b simple, cell long, two-thirds to three-fourths of wing, 2 from toward lower angle, 4 usually from angle, 7 to costa, 8 usually separate or absent, 11 from about one-third of cell or near base or absent, upper margin of cell usually obsolete on basal third. Hindwings one-half to two-thirds, lanceolate or linear cilia 2-8; 1 c absent, cell open between 4 and 5, 5 and 6 often stalked, 6 and 7 approximated anteriorly or seldom stalked."

This characterization holds good of all North American species, so far as observed, which are now listed in this family. I would add that, with the list of species now under consideration, 1 a is usually absent and 1 c weak, when present, in the forewings, and that, in the hindwing, 6 is invariably stalked with 5 when both are present. In regard to the anal veins it would appear that 1 b, which so often preserves the fork at the base, in other families, should be the strongest vein and the last to disappear. There seems to be a general tendency to eliminate both 1 a and 1 c, with 1 c the more persistent of the two. In the hindwings it is usually difficult to discern any anal vein whatever.

Metriochroa Busek¹ shows 6 stalked with 7 in the hindwing, but with a complete separation between 5 and 6, and for these reasons is not included in this paper. It is said by Meyrick to be allied to *Tischeria*. I am informed by Mr. Busek that there is some probability that the larva of another insect was described under this genus, as the collected material shows but one larva answering the published description, and two others which are typical *gracillariid* larvae, according to Heinrich.

Eucosmophora Walsingham is also not included in this paper. Meyrick states that Walsingham's description of the reduced neuration was incorrect and places this genus under *Acrocercops*. He does not however give a description of the true neuration, which is unknown to me. The species *sideroxylonella* Busek is therefore listed provisionally under *Acrocercops*.

¹ Busek, Proc. U. S. Nat. Mus., Vol. XXIII, p. 245, 1900.

The hindwings of the Lepidoptera taken as a whole, except the Micropterygidae, from which all the genera in this family are believed to have been derived, are characterized by a very simple neuration along the costal area of the wing. Two branches only were formerly supposed to remain, 7 terminating near the apex and 8 reaching the costal margin nearer the base. In a paper read by Busck before this Society in 1909¹ attention was called to the fact that the genus *Cycnodia* Herrich-Schaffer has three branches to the costa, vein 7 having two branches to the costa near the apex. At this time the author of the paper proposed the erection of a superfamily to be called the CYCNOPIOIDEA, to include genera descended from this nine veined ancestor. A few years ago the present writer's attention was called to some peculiarities in the venation of *Ornix*, as shown in Stainton's figures in Vol. III of the *Insecta Britannica*. Further investigation, with the assistance of Mr. Busck, showed the existence of species of both *Ornix* and *Gracilaria* which appeared to possess an extra, or 9th, vein in the hindwings. These facts were interpreted by Busck² as confirming the belief in the separate family rank of the Gracilariidæ a belief which had formerly rested almost wholly upon larval characters. It may be pointed out in this connection that *Cycnodia*, as noted by Busck, while derived from a form having nine veins in the hindwing, does not show the same type of neuration as *Gracilaria*. In *Cycnodia* it is a vein near the outer portion of the wing which has persisted, while in *Gracilaria* it is one near the base of the wing. Judging from the position of vein 11 in the forewing it is probably the homologous vein which has been retained in the hindwing. Spuler³ in his excellent figures shows this vein, and the interpretation appears to be the same, in regard to which vein has persisted, though he treats the matter somewhat differently. This interpretation if correct would seem to indicate that the family under consideration is an old one, instead of recent as stated by Meyrick.⁴

The hindwing of a species of the genus *Gracilaria* presents a type of venation which is fairly constant within the genus, and is more or less closely approached by other genera within the family. The most striking characters appear to be the open cell, between 4 and 5, and the relation existing between 7 and 8. Vein 8 reaches the costa not far from the base, where it fuses with it at a point where the costa drops sharply downward, producing the characteristic hump with which the hindwing in this

¹ Busck, Proc. Ent. Soc. Wash., Vol. XI, p. 92.

² Busck, Proc. Ent. Soc. Wash., Vol. XVI, p. 52, 1914.

³ Spuler, Schmet. Eur., Band 2, p. 410, 1910.

⁴ Meyrick, Gen. Ins., 128, p. 3, 1912.

family is provided. Vein 7 is quite close to 8, and parallel with it, until it reaches a point near the hump, where it curves downward, approximating 6, with which it is usually connected by a cross vein, and then slants upward toward the outer extremity of the costa. The extra vein, when present, may be found arising out of 7, just under the hump, or at times connected by a cross vein with 8. In most of the later forms however this extra vein has disappeared. The changes which take place in the various genera, when a degradation of the neuration takes place in the hindwing, are apparently quite simple. The extra vein is usually the first to be lost, followed by 4 and then usually by 3, although sometimes 3 appears rather to become transformed into a continuation of 2. Of the branches 5 and 6 it is probably 6 that is the first to disappear. The median vein (5, 6) and 7 tend to approximate one another until they may culminate in the form found in *Phyllonorycter*, and its allies, and anastomose anteriorly.

In the forewing there are several features which are thought to be particularly noteworthy. In *Acrocercops*, *Parornix* and *Parectopa* it will be seen that the position of 11 is, at the point of its origin, much farther removed from the base of the cell, and that the system of veins 10 to 7 is much more advanced along the costal margin of the cell, than is the case with *Gracilaria*. In the latter 10 arises much nearer the base than 2 while with the former genera the contrary is the case. There seems to be in the later development, in this family, a crowding of the veins toward the apex of the wing, and the formation of a more or less pointed outline at the anterior margin of the cell, when any veins have been lost in this region. This may perhaps be accounted for by the fact that in many species possessing a complete neuration the outer wall of the cell is weak. The loss of veins takes place by means of the usual methods, obsolescence or stalking. In the costal series 11 and 7 may disappear by obsolescence or, in the case of 7, by stalking with 8. Of veins 8, 9 and 10 no tendency to disappear was noted, that is to say none of these veins was observed while in the act of disappearing, either by obsolescence or by stalking. In the case of several genera with much degraded neuration, where there were no intermediate forms, Meyrick's diagnosis was accepted and vein 8 stated to be absent. In the dorsal series 2, and possibly 6, may disappear by obsolescence. In *Gracilaria* there is a tendency toward simplification by the stalking of 4 and 5, while in *Parornix*, *Parectopa* and *Acrocercops* there is a tendency to simplify by means of the stalking of 6 with 5 or 7, and accompanying it the loss of veins 2 or 3.

It may be stated that the venation of *Apophthisis* Braun could not be studied, owing to lack of material, and that it is placed

in the list of genera according to my interpretation of the figure¹ accompanying the original description.

The obsolescence of vein 2 in the Gracilariidæ appears not to have been noted by Meyrick and is not in conformity with his generic descriptions in several cases. When but one vein is absent in the dorsal series, he invariably specifies 3 as the one which has been eliminated. In authentic European specimens of *Acrocercops brogniardellum* Wallen., in the collections of the U. S. Nat. Museum, I have found that vein 2 was obsolescent while 3 remained strong. The same fact was observed in the case of *Diadictica* Wlsm. and *Chilocampyla* Busck. In the species *strigifinilella* and *salicifoliella* there is a weakening of 2 but in these cases 3 tends to disappear also. I may add that in the original description of *Chilocampyla* Busck² 3 was stated to be absent, while it may easily be seen, by the figure accompanying the description, that no veins are missing, but that 2 is disappearing and is the one which was overlooked.

It may be well to take up at this point some discrepancies which have been noted in reviewing Meyrick's Revision of the Gracilariidæ and which show the need of accurate figures to accompany verbal descriptions. In the case of *Leucanthiza*³ Clem., it is stated that 5 and 6 are stalked in the hindwings, while the figure of the venation of this genus, Fig. 29 (b), shows that vein 6 is absent. In this case as with *Chilocampyla* Busck, mentioned above, the figure is correct while the description is not. In regard to the genus *Epicephala* Meyr.⁴ there is a similar disagreement. It is here stated that vein 3 of the forewing is absent while the figure 21 a shows all 12 veins to be present. In this case the writer is unable to judge whether the figure or the description is correct. The only figure given of a species of the genus *Gracilaria* is that of *G. alchimiella* Scop.⁵ which shows 5 and 6 stalked, in the hindwing, and the stalk arising out of 7, a type of venation which I have been unable to find in any of the North American species of *Gracilaria*, and which does not appear in any of the European forms examined, including *syringella*, *elongella*, *stigmatella*, *auroguttella* and *alchimiella*. The presence also of 1 a in the forewing is certainly not normal as I have been unable to find it in any of the species examined.

The task of revising the Gracilariidæ of the world must have been very difficult and one which no one but Mr. Meyrick was

¹ Braun, Can. Ent., Vol. XLVII, p. 190, fig. 20, 1915.

² Busck, Proc. U. S. Nat. Mus., Vol. XXIII, p. 248.

³ Meyrick, Gen. Ins., 128, p. 12, 1912.

⁴ Meyrick, Gen. Ins., 128, p. 13, 1912.

⁵ Meyrick, Gen. Ins., 128, fig. 24b, 1912.

competent to undertake. It is not surprising however, considering the magnitude of the undertaking, that a few of our North American species are not properly listed. In the following pages the genera will be taken up in the order given by Meyrick and the reasons given for all changes which have been made.

The list of species under *Lithocolletis* has not been revised. This group has been so carefully studied by Miss Braun that, in the list of species which follows this paper, the arrangement given in her Revision will be followed. The only exception made is the listing of *Cameraria* Chapman, and the use of *Phyllo-norycter* Hb. instead of *Lithocolletis* Hb. As to *Cameraria*, it would seem illogical to object to a division based upon larval characters, within a family whose family rank rests mainly upon a characteristic structure in the larval stage. One species only may be noted here, on account of the fact that it has the abnormal habit of forming its cocoon outside the mine. Upon examining the venation of this species, *ostensackenella* Fitch, it was found that the venation is abnormal, the two veins nearest the apex of the forewing arising from a short stalk from the tip of the cell.

Porphyrosela Braun is retained as a good genus as it is believed that it should not be dropped without further investigation.

Several species, noted later, were transferred from other genera and placed under *Marmara* Clemens. *Aesyle* Chambers, is removed from its position, as a synonym of *Acrocercops*, and made a synonym of *Marmara*, as *fasciella* Ch., the type species, belongs to this genus.

Under *Acrocercops* Wallengren, the writer has placed only those species which correspond rather closely to the type species *brogniardellum* Fabr. It is believed that Meyrick's conception of this genus is much too broad and that the group as listed by him will eventually be broken up. An additional reason for this restriction of the genus is the fact that in *albinatella* Ch. we have a species which corresponds generically in practically every detail with *brogniardellum*. It may be noted here also that Meyrick's very broad definition of the genus *Acrocercops* does not cover the venation of the type species, *brogniardellum*, which has 5 and 6 of the forewings stalked, the other veins remaining separate. This fact is also recorded by Stainton,¹ in regard to the relation of 5, 6. The following species were removed from under *Acrocercops*, because they did not fall within the limits of *Acrocercops*, under Meyrick's definition: *sebastianella* Busek, transferred to *Gracilaria*, from an examination of mounted wings, forewing not denuded; *fasciella*, to *Marmara* on venation; *strigifinitella* was

¹ Stainton, Ins. Brit., Vol. III, Pl. 6, fig. 11a, 1854.

made the type of a new genus; *randiella*, made the type of a new genus; *venustella* transferred to *Leucospilapteryx* Spuler; *boreasella* Clem. removed to *Parornix* Spuler, on Clemens description of the venation.¹ In regard to *boreasella* a word of explanation is required. Clemens described the species from a single specimen without a head and much mutilated, basing his determination upon the neuration, as he says, almost exclusively. Although he says it differs somewhat from the venation of species of *Parornix* sp. (*Ornix* Tr) then known to him, he was undoubtedly correct in his determination. I would direct particular attention to his description of the venation of the hindwings, which is as follows: "In the hindwings the venation is the same as in other members of the genus, except that the inosculation of the bifid subcostal vein with the tip of the costal, and of the lower branch of the former with the furcate discal *nervule*, is almost obsolete and very indistinct."² It will be noted that Clemens here has called attention to the three branches of the costa, shown in the species having the extra vein in the hindwing, mentioned at the beginning of this paper. Dietz³ the last one to revise the North American species of *Parornix* Spl. (*Ornix* Tr) says that he believes it to be a true *Ornix* Tr.

Spuler's genus *Eutrichocnemis*³ was erected without a description of the neuration and he places under it the two species *simpliciella* V. Rösl, and *scalaricella* Zell. but does not specify the type. As Walsingham made *scalaricella* Zell. the type of his genus *Dialectica*, I would propose, in order to simplify matters, to consider *scalaricella* Zell. as the type species and list *Eutrichocnemis* as a synonym of *Dialectica*. The genus represented by these two names is placed provisionally under *Acrocercops*. One species, *onosmodiella* Busek, corresponds more closely to *Dialectica* in venation than it does to *Acrocercops*, differing from the former genus chiefly in that vein 2 of the forewing is absent.

It was believed that *texanella* Busek should be transferred from *Parectopa* Clemens, to *Parornix* Spuler, which it most resembles in venation. The venation is quite close to that of *guitea* Haw. but in some respects it is an interesting species quite different from any other listed under this genus. The species *astericola* Frey and Boll, *quinquestrigella* Cham. and *rhombiferulum* Frey and Boll, were transferred from *Parectopa* to *Acrocercops* on external characters, following Meyrick's scheme. The species *salicifoliella* Cham., was found to correspond closely with the

¹ The Tineina of N. A., p. 237, 1872.

² Trans. Am. Ent. Soc., Vol. XXXIII, p. 290, 1907.

³ Spuler, Schmet. Eur. Band 2, p. 409, 1910.

type of Spuler's genus *Micrurapteryx*¹ and that genus is therefore included in this list.

Under *Gracilaria* the following changes have been made, *fulgidella* Clem. and *Elotella* Busek have been transferred to *Marmara*, on account of complete accord in venation as well as in other respects.

The classification which is here presented is based principally upon the position of vein 11 in the forewings, the movement forward of the costal or the dorsal series of veins along the anterior portion of the cell, and the relationship of veins 7 and 8 in the hindwings. There is one character which has not been included in the present paper which may prove to be of value. *Acrocercops* has a weak longitudinal vein through the middle of the cell in the forewings which appears to have been wholly lost in *Gracilaria*. The same vein is shown very faintly and broken only in some of the other genera.

There would appear to be three main branches within this family, represented by *Gracilaria*, *Parornix* and *Acrocercops*. Of these *Gracilaria* is generally accepted as approaching most nearly the primitive form. Some species of *Parornix*, however, in the shape of the wings and form of venation of the hind wings, are strongly suggestive of the *Micropteryx* type. Stainton indeed uses the name *Ornithidae* for the family (p. 10, Ins. Brit., 1854) though he afterwards abandons it in favor of *Gracillariidae*. *Parectopa* appears to be an intermediate between *Gracilaria* and *Parornix*. *Micrurapteryx* is from gracillariid stock and is related to *Parectopa* while *Dialectica*, *Chilocampyla*, *Leucospilapteryx* and *Apophthisis* are closely related to *Acrocercops*. *Marmara* preserves a portion of the base of 7 parallel to 8 which suggests a relationship to the Gracillariid branch probably nearest to *Parectopa*. *Phyllonorycter* and its allies do not show a close relationship to any of the other genera and the parallel condition of 7 with 5, 6, is a great departure from the form of venation found in *Gracilaria*. It may be that this group is worthy of the family rank that is given it by some authors.

The difficulties in the way of interpreting a degraded neuration are illustrated in the case of *Leucanthiza*. There is nothing in the venation to show that it may not have been derived from *Gracilaria*, at the same time there is no positive evidence that it was so derived. The venation of the hindwings has been reduced to very nearly the simplest terms. There remain only the stems of the main branches, all separate. It would be difficult to see, for example, were venation the only guide, why the

¹ Spuler, Schmet. Eur. Band 2, p. 409, 1910.

genus *Phyllocoptis* included in a very different family might not be included with *Leucanthiza*. It is here that we are forced to fall back upon larval characters. *Leucanthiza* is therefore included in the Gracilaridiidae mainly on larval characters. The only suggestion of a family characteristic noted by the writer in this case, is the short vein 8 to the hump, in the hind wings.

The arrangement of genera which follows is constructed mainly upon venational characters, a few additional hints are however given for those who may wish to use it as a key.

The writer wishes to express his thanks to Mr. Heinrich for comparing the genitalia of a number of species whose status was in doubt. To Mr. Busck he wishes to gratefully acknowledge his indebtedness for help and advice upon numerous occasions. It is through the latter that there were available a number of named species which had been compared with Chambers' types, as well as notes regarding them.

KEY TO GENERA.

1. Hindwings with branch to costa between terminations on costa of 7 and 8.....	2
Hindwings without branch to costa between terminations on costa of 7 and 8.....	3
2. Forewings, 11 from near base of cell (head smooth) (<i>Gracilaria</i> (part))	
Forewings, 11 from about $\frac{1}{3}$ of cell (head rough).....	<i>Parornix</i>
3. Hindwings, 8 veins (4 weak in <i>Micrurapteryx</i>).....	4
Hindwings, less than 8 veins.....	9
4. Forewings, 11 from near base of cell (hind tibiae smooth).....	5
Forewings, 11 from $\frac{1}{3}$ of cell or beyond $\frac{1}{3}$ (hind tibiae with bristles above).....	6
5. Forewings, 6 and 7 separate.....	<i>Gracilaria</i> (part)
Forewings, 6 and 7 stalked.....	<i>Micrurapteryx</i>
6. Forewings, 12 veins (11 veins in <i>onosmodiella</i>).....	7
Forewings, less than 12 veins.....	8
7. Forewings, 6 separate (base of antennae with eye flap) (<i>Chilosampyla</i>)	
Forewings, 6 stalked, with 5 or with 7.....	<i>Acrocercops</i>
8. Forewings, 7 stalked with 8, or absent.....	<i>Leucospilapteryx</i>
Forewings, 7 stalked with 6.....	<i>Apophthisis</i>
9. Hindwings, 7 veins (5 and 6 stalked).....	10
Hindwings, less than 7 veins.....	12
10. Forewings, 11 very near base of cell (10 not toward end of cell).....	11
Forewings, 11 from about $\frac{1}{3}$ of cell (10 toward end of cell).....	<i>Parectopa</i>
11. Forewings, 12 veins, 2 and 3 weak (hind tibiae bristles above).....	
Forewings, 11 veins, one dorsal branch absent (hind tibiae smooth).....	<i>Neurobathra</i>
<i>Gracilaria</i> (part)	

12. Hindwings, 6 veins, 5 and 6 stalked.....	13
Hindwings, 5 veins, 6 absent.....	16
13. Forewings, 12 veins, separate, 11 near base (hind tibiae bristles above)	
Forewings, 11 absent (hind tibiae without bristles).....	11
14. Forewings, 9 veins.....	
Forewings, less than 9 veins.....	15
15. Forewings, 8 veins (head rough).....	
Forewings, 7 veins (head smooth).....	Marmara
16. Forewings, 9 veins (head smooth).....	Leucanthiza
Forewings, 7 veins (head rough).....	Phyllonorycter Cameraria
Forewings, 6 veins (head rough).....	Porphyrosela

Porphyrosela Braun.

Type: *Porphyrosela desmodeilla* Clem.

Characters as in *Phyllonorycter* Hb. except that vein 10 is obsolescent or absent, the hind tibiae without hairs and the basal joint of the antennae without a peeten.

Cameraria Chapman.

Type: *Phyllonorycter rajella* Linn.

Characters as *Phyllonorycter* except that the larva is flat and the nerve always on the upper side of the leaf of the food plant.

Phyllonorycter Hübner.

Type: *Cameraria guttifinitella* Clem.

Head roughly tufted on crown, face smooth. Antennae about 1, basal joint rather thick, usually with slight peeten. Labial palpi moderate or short, porrected or drooping, filiform, pointed. Maxillary palpi minute, filiform, porrected or rudimentary. Posterior tibiae with loosely appressed hairs. Forewings lanceolate; 7 veins, 3 absent, 4 absent, 6 absent, 8 absent, 11 absent. Hindwings about $\frac{1}{2}$, linear, lanceolate, cilia 4-5; 3 absent, 4 absent, 6 absent.

Larva cylindrical.

Cremastobombycia Braun.

Type: *Cremastobombycia solidaginis* Frey and Boll.

Characters as in *Phyllonorycter* Hb. except that vein 6 is present, stalked with 5, in both forewing and hindwing.

Marmara Clemens.

Type: *Marmara solictella* Clem.

Head smooth. Antennae $\frac{1}{2}$ to 1, basal joint thick with slight peeten. Labial palpi moderate, porrected, slender, pointed. Maxillary palpi

moderate, porrected, loosely scaled toward tip. Posterior tibiae smooth scaled. Forewings lanceolate; 3 absent, 4 absent, 6 absent, 8 absent, 11 absent. Hindwings about $\frac{1}{2}$, linear lanceolate, 3 absent, 4 absent, 5 and 6 stalked.

The venation of the forewings is very similar to that of *Phyllonorycter* Hb., but differs from the latter in that 7 approximates 8 toward the base and is well separated from the stalk of veins 5 and 6 in the hindwings.

Leucanthiza Clemens.

Type: *Leucanthiza amphicarpeae foliella* Clem.

Head loosely rough haired on crown, face smooth. Antennae 1, basal joint hardly thickened. Labial palpi short, slender, drooping. Maxillary palpi rudimentary. Posterior tibiae with appressed scales. Forewings lanceolate; 3 absent, 4 absent, 11 absent. Hindwings about $\frac{1}{2}$, narrow lanceolate, cilia 4; 3 absent, 4 absent, 6 absent.

It should be noted that vein 6 is not stalked with 5 as stated by Meyrick but is absent.

Neurolipa nov. gen.

Type: *Neurolipa randiella* Busek.

Head smooth. Antennae 1, base enlarged with faint pecten. Labial palpi loosely scaled, porrected or drooping, end joint equal to second, curved. Maxillary palpi moderate, filiform, loosely scaled, porrected. Hind tibiae with long appressed hairs. Forewings elongate, acuminate; 9 veins, 11 absent, one costal and one dorsal branch absent from near outer end of cell. Hindwings linear; 6 veins, 2, 3 and 4 coincident, 5 and 6 stalked.

This genus has a venation apparently derived from the *Acrocercops* type but the hind tibiae are similar to *Phyllonorycter* Hb.

Apophthysis Braun.

Type: *Apophthysis pullata* Braun.

Head with appressed scales. Antennae somewhat under 1, basal segment with pecten. Labial palpi moderate, straight, drooping. Maxillary palpi rudimentary. Posterior tibiae with a row of short projecting scales above. Forewings lanceolate, the margin from the inner angle to the apex is almost straight or slightly concave; 2 almost obsolete, 3 absent, 4 indistinct, from lower angle of the cell, 5 absent, 6 and 7 stalked, transverse vein indistinct between 4 and 6, 11 obsolete except at origin and near costa. Hindwings about $\frac{1}{2}$, lanceolate, cilia 5; 5 and 6 stalked.

This genus is known to me only from the original description given above and the figure of the venation which accompanies

the description. It appears to be a derivative of the *Acrocercops* group.

Leucospilapteryx Spuler.

Type: *Leucospilapteryx omissella* Stainton.

Head smooth. Antennae 1, base somewhat enlarged. Labial palpi moderate; somewhat roughly haired, porrected, end joint equal second, recurved. Maxillary palpi filiform, small, porrected. Hind tibiae with row of bristly hairs above. Forewings elongate lanceolate; 11 more than $\frac{1}{2}$ of cell from the base and strongly joined to cell, 7 stalked with 8, or absent, one dorsal branch from cell absent (possibly 3), 4 and 5 short-stalked. Hindwings nearly linear, acuminate; 8 veins, 5 and 6 stalked and joined to 7 by a cross vein near middle of wing.

A genus derived from the *Acrocercops* group.

Acrocercops Wallengren.

Type: *Acrocercops brogniardellum* Fabr.

Head smooth. Antennae more than 1, labial palpi long, curved, ascending, tufted beneath on second joint, terminal joint equal to second, pointed. Maxillary palpi filiform, porrected. Posterior tibiae with row of bristly hairs above. Forewings elongate and acuminate; 12 veins, 2 weak toward its base, 5 and 6 stalked; (In *Diadicta*, Wlsn, 6 is stalked with 7), origin of 11 distant from base of cell. Hindwings about one-half, narrow lanceolate; 8 veins, 5 and 6 stalked and connected to 7 by cross vein.

The above description is given from a European specimen of the type species, and is very much more restricted than that given by Meyrick in the Gens. Ins.

Chilocampyla Busek.

Type: *Chilocampyla dyariella* Busek.

Head smooth. Antennae nearly $1\frac{1}{2}$, basal joint somewhat flattened and enlarged with a projecting flap of dense scales. Labial palpi long, smooth, curved, subascending, pointed. Maxillary palpi filiform, moderate, porrected. Middle tibiae thickened with heavy tuft of scales. Posterior tibiae with double row of bristles above. Forewings elongate lanceolate; 12 veins, 2 weak, 6 and 7 stalked, 11 from toward middle of cell margin (10 in ♂ obliterated by a costal depression). Hindwings $\frac{1}{2}$, linear; 8 veins, 5 and 6 stalked.

A genus related to *Acrocercops* Wallgr. both by venation and hind tibiae. Separated from this genus by its flap of scales at the base of the antennae and thickened middle tibiae.

Neurostrata nov. gen.

Type: *Neurostrata gunniella* Busek.

Head smooth. Antennae 1, basal joint slightly enlarged. Labial palpi moderately long, porrected, smooth, end joint equal to second, pointed, upcurved. Maxillary palpi moderate, filiform, porrected. Posterior tibiae with row of bristly hairs above. Forewings lanceolate; 12 veins, all well separated, 2 weak at base, 11 from near base, not joined to cell. Hindwings linear lanceolate, acuminate; 6 veins, 4 absent, 2 and 3 coincident (in some specimens a portion of 2 is faintly discernible), 5 and 6 stalked and connected with 7, base of 7 parallel to 8, in the ♂ a spiny process at the termination of 8 on the costa.

A genus related to the *Acrocercops* group but with broader wings, complete venation and basal origin of 11, in the forewings, and degraded neuration in the hindwings.

Nerobathra nov. gen.

Type: *Nerobathra strigifinitella* Clemens.

Head smooth. Antennae 1, basal joint somewhat enlarged, very faint peeten of few hairs. Labial pulpi moderately long, porrected, end joint equal in length to second, pointed up curved. Maxillary palpi moderate, filiform, porrected. Posterior tibiae with row of bristly hairs above. Forewings narrowly lanceolate; 12 veins, 11 from very near the base of cell, 2 and 3 very weak, 3 out of the base of 4, 4 and 5 widely separated. Hindwings linear-lanceolate; 7 veins, 4 absent, 5 and 6 stalked, 7 close to 8 near origin, approaching or connected with stalk of 5 and 6 near middle of wing, costal fold in ♂ producing deformed neuration.

This genus may be separated from others in the *Acrocercops* group by the basal origin of vein 11 and the weakened condition of both 2 and 3 in the forewing and the absence of vein 4 in the hindwing. The venation resembles *Micrurapteryx* Spuler from which genus it may be separated by the characters of the hind tibiae.

Parectopa Clemens.

Type: *Parectopa lespedezae foliella* Clem.

Head with appressed scales. Antennae 1, with slight peeten. Labial palpi moderately long, curved upward, terminal joint equal second in length, smooth or slightly roughened. Maxillary palpi moderate, filiform, porrected. Middle and hind tibiae smooth scaled. Forewings elongate, acuminate; 11 veins (or sometimes 10), 2 or 3 absent (or sometimes both 2 and 3), 6 and 7 often stalked, 11 from about $\frac{1}{3}$ of cell from base. Hind wings about $\frac{1}{2}$, linear lanceolate; 7 veins, 5 and 6 stalked, 4 absent.

The above description is based mainly on a study of *P. robinicella* Clem. bred specimens of *P. lespedezaefoliella* not being available. Clemens in his original description gives 8 as arising out of 7 near its base.

The genus as given above is more narrowly restricted than as given by Meyrick, whose definition would include *Micrurapteryx* Spuler, given below.

Micrurapteryx Spuler.

Type: *Micrurapteryx Kollaricella* Zeller.

Head smooth, erectile tufts of scales at either side of crown. Antennae 1, basal joint moderately enlarged. Labial palpi smooth, porrected or drooping. Maxillary palpi filiform, small. Hind tibiae smooth. Forewings elongate lanceolate, acuminate; 12 veins, 11 from near base, 6 and 7 stalked, 2 and 3 stalked and weak. Hind wings $\frac{1}{2}$ nearly linear, 8 veins, 4 very weak, 5 and 6 stalked.

This genus is probably an older form from which *Parectopa* Clemens, may have been derived. It is apparently more nearly related to *Gracilaria* than is the case with *Parectopa*.

Parornix Spuler.

Type: *Parornix anglicella* Stainton.

Head rough haired, face smooth. Antennae about 1, basal joint moderate. Labial palpi moderately long, slightly curved, porrected or sub-ascending, smooth scaled, terminal joint shorter than second, pointed. Maxillary palpi moderately long, filiform, porrected. Posterior tibiae smooth scaled. Forewings lanceolate or elongate lanceolate; 11 veins, one dorsal vein absent (2 or 3, possibly), 6 and 7 stalked, 11 from about $\frac{1}{3}$ of cell from base. Hindwings, 3, narrow lanceolate; 4 usually absent, a branch to costa from cell between 7 and 8.

This genus corresponds to *Ornix* as given by recent authors. The latter name must unfortunately be ruled out of existence. For a recapitulation of the reasons for the change of name see Walsingham, Biol. Centr. Amer. IV, p. 341, 1909-1915. This genus may be separated from *Gracilaria* by means of its rough head.

It may be that the group of species related to *guttea* Haw. may have to be removed from this genus. Spuler places them under *Ornix* Tr., and separates them from his genus *Parornix*. If, however, the name *Ornix* is to fall it will necessitate the substitution of a new name for *Ornix* Tr., to include the species related to *guttea* Haw. having a complete venation in the hindwing.

Gracilaria Haworth.Type: *Gracilaria syringella* Fabricius.

Head smooth. Antennae 1 or over 1, basal joint more or less elongate. Labial palpi long, curved, ascending, second joint sometimes with tuft beneath, terminal joint about as long as second, pointed. Maxillary palpi moderate, filiform, porrected. Middle tibiae tufted with dense scales, posterior tibiae smooth. Forewings elongate lanceolate or narrowly elongate; normally 12 veins (one dorsal branch from cell sometimes absent), 4 and 5 sometimes stalked. Hind wings about $\frac{1}{2}$, narrowly elongate, acuminate; 8 veins usually (sometimes anabsolent additional vein is distinguishable arising from the stem of 7 beneath the termination of 8 on the costa), 5 and 6 stalked.

This is a large genus which will probably eventually be broken up. Among our North American species we have none which comes close to *syringella*, the type, nor indeed to the species proposed as types of *Euspilapteryx* Steph., *Aspilapteryx* Spuler and *Xanthospilapteryx* Spuler. Practically all our species, hitherto described, will be found under Meyrick's division E of the genus *Gracilaria* and form quite a compact group, easily separable from other members of the family. In most of our species the venation is complete and but little tendency of the veins to stalk with one another is shown.

EXPLANATION OF PLATES.**PLATE VI.**

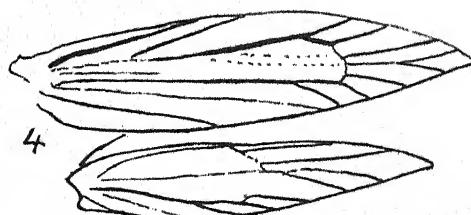
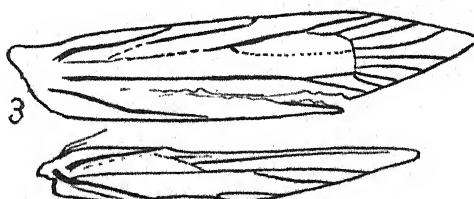
Fig. 1. *Gracilaria elongella* Linn. (European).
 Fig. 2. *Gracilaria murtfeldtella* Busck (Hindwing).
 Fig. 3. *Gracilaria syringella* Fabr. (European).
 Fig. 4. *Parornix guttea* Haw. (European).

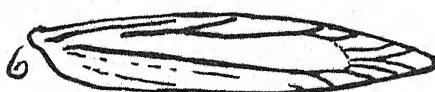
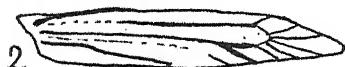
PLATE VII.

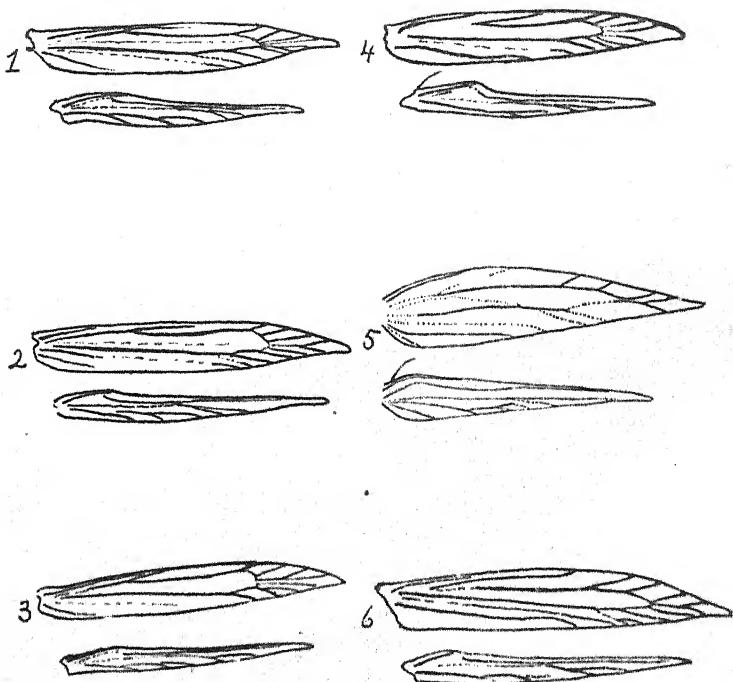
Fig. 1. *Cremastobombycia solidaginis* Frey and Boll.
 Fig. 2. *Neurolipa randiella* Busck.
 Fig. 3. *Parornix preciosella* Dietz.
 Fig. 4. *Leucanthisa amphicarpeaefoliella* Clemens (after Clemens).
 Fig. 5. *Marmara fasciella* Chambers.
 Fig. 6. *Acrocercops onosmodiella* Busck (Forewing).

PLATE VIII.

Fig. 1. *Acrocercops brogniardellum* Fab. (European).
 Fig. 2. *Acrocercops (Dialectica) scalariella* Zell (European).
 Fig. 3. *Leucospilapteryx venustella* Clemens.
 Fig. 4. *Parectopa pennsylvaniella* Engel.
 Fig. 5. *Apophthisis pullata* Braun (after Braun).
 Fig. 6. *Micrurapteryx salicifoliella* Chambers.







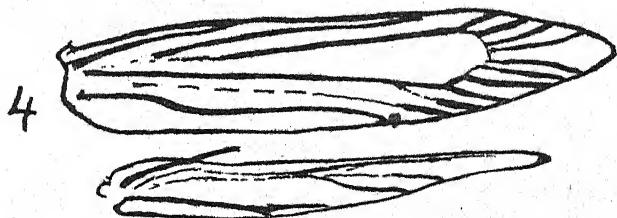
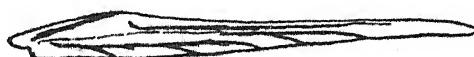
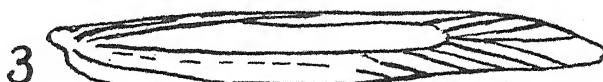
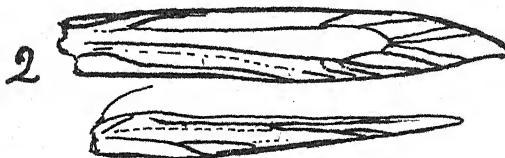


PLATE IX.

Fig. 1. *Gracilaria stigmatella* Fabr. (Form *purpuriella*, Chambers).
 Fig. 2. *Neurobathra strigifinitella* Clemens.
 Fig. 3. *Chilocampyla dyariella* Busck.
 Fig. 4. *Neurostrota gunniella* Busck.

The following list has for the most part been compiled from the lists of Dyar and Meyrick and the card catalogue of species in the U. S. Nat. Museum collections.¹

With the exception of a few additions of recently described species, or corrections already noted, no revision has been made as to the identification or arrangement of species listed in Braun's Rev. of N. Am. *Lithocolletis* or in the Rev. of *Ornix* by Dietz. In regard to the relationship and arrangement of genera related to *Phyllonorycter* Hb. (*Lithocolletis*) one is referred to the works of Braun and Chapman and to Busck, Proc. Ent. Soc. Wash., XI, p. 100, 1909 and also to a letter from Meyrick, Proc. Ent. Soc. Wash., XI, p. 187, 1909.

For a more extended list of references to the synonymy of genera under *Gracilaria*, *Acrocercops*, *Parornix* (*Ornix*) and *Phyllonorycter* (*Lithocolletis*) one should consult Walsingham, Biol. Centr. Amer., 1915.

In all other genera than those included in the papers of Braun and Dietz, referred to above, the material in the U. S. Nat. Mus. has been examined with care, and all species which are not represented in the U. S. Nat. Mus. collections are marked with an asterisk (*) and their places in the list are based on published descriptions only. Species represented in the collections but which could not be satisfactorily examined as to venation, and which should be further studied in this respect, are marked with the symbol (†).

Names of species are given as originally printed and new names or revisions in spelling are not accepted, save only where a typographical error has been corrected.

As a result of data obtained by Mr. Carl Heinrich upon the comparison of the male genitalia of certain European and American species, closely resembling one another, it was found that *elongella* L. and *alnivorella* Cham. are distinct species, and the former is dropped from the list. In the case of *stigmatella* Fabr. and *purpuriella* Cham., however, there appeared to be no difference and the latter is therefore made a synonym of *stigmatella*.

¹ Since this list was prepared the Check List of the Lepidoptera of Boreal America, Barnes and McDonough, Decatur, Ill., Feb. 1917, has appeared. The latter, so far as the Gracillariidae are concerned, closely follows Meyrick's lists.

In regard to *cuculipennellum* Hüb. and *fraxinella* Ely the difference was so slight as to be questionable. The latter is therefore listed as a doubtful synonym of the former. The other European species, *salconipennella* Hüb. and *alciniella* Scop., have been dropped from the list of American species, as is done by Meyrick.

It was thought best not to disturb the existing synonymy under *alnivorella* Chambers. It is quite likely that several good species may be included under this name but it does not seem advisable to attempt to separate them, in the absence of sufficient bred material. It may be pointed out here that Chambers claimed that *alnivorella* and *alnicolella* differed in their food habits.

A LIST OF THE GRACILARIIDAE OF NORTH AMERICA.

(Dyar Cat = Dyar, Bull. 52, U. S. Nat. Mus. Wash., 1902.)

Meyr. Cat = Meyrick, Lep. Cat., pars. 6, 1912.)

Family GRACILARIIDAE.

PORPHYROSELA Braun.

Rev. Am. Lith., p. 348, pl. XX, fig. 8, 1908.

Type: *desmodiella* Clemens.

desmodiella Clemens, Proc. Acad. Nat. Sci. Phil., p. 220, 1859; Tin. No. Ann., pp. 65, 68, 1872; Chambers, Can. Ent., III, pp. 127, 162, 1871; Jn. Cin. Soc. Nat. Hist., II, p. 189, 1879; Frey & Boll, Stett. ent. Zeit., XXXVII, p. 227, 1876; Wlsm., Trans. Am. Ent. Soc., X, p. 202, 1882; Busck, Proc. Ent. Soc. Wash., V, p. 187, 1903; Dyar, Cat., No. 6303; Braun, Am. Lith., p. 348, pl. XXIV, figs. 14, 15, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 110—, fig. 9, 1914.

syn: *gregariella* Murtf., Can. Ent., 13, p. 245, 1881; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

Foodplants: *Desmodium*, *Lespedeza*, *Phaseolus*; under mine. **East U. S.**

GAMERARIA Chapman.

The Entomologist, vol. XXXV, p. 141, 1902.

Type: *guttifinitella* Clemens.

gaultheriella Wlsm., Ins. Life., II, p. 79, 1889; Dyar, Cat., No. 6291; Braun, Rev. Am. Lith., p. 324, pl. XXIII, fig. 6, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 91, 1914.

Foodplant: *Gaultheria shallon*; upper mine. **West. U. S., Brit. Col.**

nemoris Wlsm., Ins. Life., II, p. 116, 1899; Dyar, Cat., No. 6293; Braun, Rev. Am. Lith., p. 324; pl. XXIII, fig. 7, 1908; Meyr., Gen. Ins.,

128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 90, 1914.

Foodplant: *Vaccinium ovala*; upper mine.

Calif.

caryaefoliella Clemens, Proc. Acad. Nat. Sci. Phil., p. 323, 1859; Tin. No. Am., pp. 65, 74, 1872; Chambers, Can. Ent., III, pp. 109, 165, 1871; Frey & Boll, Stett. ent. Zeit., XXXIX, p. 273, 1878; Busek, Proc. Ent. Soc. Wash., V, p. 189, 1903; Dyar, Cat., No. 6288; Braun, Rev. Am. Lith., p. 325, pl. XXIII, fig. 8, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 72, 1914.

syn: *juglandiella* Clemens, Proc. Ent. Soc. Phil., I, p. 81, 1861; Tin. No. Am., p. 170, 1872; Chambers, Can. Ent., III, p. 165, 1871; XI, p. 91, 1879; Packard, Guide Stud. Ins., p. 353, 1869; Braun, Rev. Am. Lith., p. 325, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39.

syn: *caryifoliella* Meyr., Meyr., Cat., p. 39.

Foodplant: *Hicoria Juglans*; upper mine.

East. U. S.

lentella Braun, Rev. Am. Lith., p. 326, pl. XXIII, fig. 9, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 73, 1914.

Foodplants: *Betula lenta*; *Ostrya virginiana*; upper mine. East. U. S.

saccharella Braun, Ent. News., XIX, p. 104, 1908; Braun, Rev. Am. Lith., p. 327, pl. XXIII, fig. 10, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 76, 1914.

Foodplant: *Acer*; upper mine.

N. J., Ohio.

macrocarpella Frey & Boll, Stett. ent. Zeit., XXXIX, p. 261, 1878; Wlsm., Ins. Life., II, p. 78, 1889; Dyer, Cat., No. 6289; Braun, Rev. Am. Lith., p. 328, pl. XXIII, fig. 11, 1912; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 74, 1914.

Foodplant: *Quercus macrocarpa*; upper mine.

Tex. N. J.

cincinnatiella Chambers, Can. Ent., III, pp. 146, 149, 1871; Cin. Quart. Jn. Sci., I, p. 203, 1874; Bull. Geol. Surv. Terr., III, p. 141, 1877; Wlsm., Ins. Life., II, p. 78, 1889; Dyer, Cat., No. 6287; Braun, Rev. Am. Lith., p. 329, pl. XXIII, fig. 12, 1912; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 75, 1914.

Foodplant: *Quercus alba*; upper mine.

East. U. S.

hamadryadella Clemens, Proc. Acad. Nat. Sci. Phil., p. 324, 1859; Tin. No. Am., 65, 77, 1872; Chambers, Can. Ent., III, pp. 55, 164, 182, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1875; II, p. 104, 1875; Frey & Boll., Stett. ent. Zeit., XXXIX, p. 262, 1878; Busek, Proc. Ent. Soc. Wash., V, p. 190, 1903; Dyer, Cat., No. 6334; Braun, Rev. Am. Lith., p. 329, pl. XXIII, fig. 13, 1912; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 77, 1914.

syn: *alternatella* Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 351, 1875; Braun, Rev. Am. Lith., p. 329, 1912; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39.

syn: *alternata* Chambers, Bull. Geol. Surv. Terr., IV, p. 153, 1878; Braun, Rev. Am. Lith., p. 329, 1912.

Foodplants: *Quercus alba*; *Magnolia*; *Ostrya virginiana*; upper mine.

East U. S.

umbellulariae Wlsm., Ins. Life., II, p. 78, 1889; Dyar, Cat., No. 6290; Braun, Rev. Am. Lith., p. 330, pl. XXIII, fig. 14, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 78, 1914.

Foodplant: *Umbellularia californica*; upper mine.

Calif.

agrifoliella Braun, Ent. News., XIX, p. 105, 1908; Braun, Rev. Am. Lith., p. 331, pl. XXIII, fig. 15, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 79, 1914.

Foodplant: *Quercus agrifolia*; upper mine.

Calif.

conglomeratella Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 346, 1875; Wlsm., Ins. Life., II, p. 24, 1889; Dyar, Cat., No. 6295; Braun, Rev. Am. Lith., p. 332, pl. XXIII, fig. 16, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 94, 1914.

syn: *bicolorella* Chambers, Bull. Geol. Surv. Terr., IV, p. 103, 1878; Braun, Rev. Am. Lith., p. 332, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39.

syn: *obtusilobae* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 265, 1878; Braun, Rev. Am. Lith., p. 332, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39.

Foodplant: *Quercus virginiana*; upper mine.

U. S.

ulmella Chambers, Can. Ent., III, p. 148, 1871; Cin. Quart. Jn. Sci., I, p. 202, 1874; II, p. 101, 1875; Frey & Boll, Stett. ent. Zeit., XXXIV, p. 214, 1873; Wlsm., Ins. Life., II, p. 24, 1889; Dyar, Cat., No. 6294; Braun, Rev. Am. Lith., p. 333, pl. XXIII, fig. 17, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 95, 1914.

syn: *modesta* Frey & Boll, Stett. ent. Zeit., XXXVII, p. 224, 1876; XXXIX, p. 274, 1878; Braun, Rev. Am. Lith., p. 333, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39.

Foodplant: *Ulmus*; upper mine.

East and South U. S.

quercivorella Chambers, Can. Ent., XI, p. 145, 1879; Wlsm., Ins. Life., II, p. 24, 1889; Dyar, Cat., No. 6296; Braun, Rev. Am. Lith., p. 334, pl. XXIII, fig. 18, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 93, 1914.

Foodplant: *Quercus*; upper mine.

East U. S.

mediodorsella Braun, Rev. Am. Lith., p. 335, pl. XXIII, fig. 19, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 92, 1914.

Foodplant: *Quercus*; upper mine.

Calif.

australisella Chambers, Bull. Geol. Surv. Terr., IV, p. 103, 1878; Dyar, Cat., No. 6297; Braun, Rev. Am. Lith., p. 335; pl. XXIII, fig. 20, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 39; Braun, Jn. Ac. Nat. Sci. Phil., pp. 117—, fig. 83, 1914.

syn: *australella* Meyr., Meyr., Cat., p. 39.

Tex.

chambersella Wlsm., Ins. Life., II, p. 78, 1889; Dyar, Cat., No. 6300; Braun, Rev. Am. Lith., p. 336, pl. XXIII, fig. 21, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 85, 1914.

syn: *quinquenotella* Chambers, Jn. Cin. Soc. Nat. Hist., II, 189, 1800; Braun, Rev. Am. Lith., p. 336, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40.

Tex.

cervina Wlsm., Proc. U. S. Nat. Mus. XXXIII, p. 221, 1907; Braun, Rev. Am. Lith., p. 336, pl. XXIII, fig. 22, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 86, 1914.

N. Y.

platanoidiella Braun, Ent. News., XIX, p. 106, 1908; Braun, Rev. Am. Lith., p. 337, pl. XXIII, fig. 23, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 87, 1914.

Foodplant: *Quercus*; upper mine.

Ohio, N. Y.

fletcherella Braun, Rev. Am. Lith., p. 338, pl. XXIII, fig. 24, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 80, 1914.

Foodplant: *Quercus*; upper mine.

Can.

arcuella Braun, Ent. News., XIX, p. 107, 1908; Rev. Am. Lith., p. 338, pl. XXIV, fig. 1, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 81, 1914.

Va.

betulivora Wlsm., Ins. Life., III, p. 326, 1891; Dyar, Cat., No. 6328; Braun, Rev. Am. Lith., p. 339; pl. XXIV, fig. 2, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 82, 1914.

Foodplant: *Betula*.

Locality?

eppelsheimii Frey & Boll, Stett. ent. Zeit., XXXIX, p. 272, 1878; Dyar, Cat., No. 6325; Braun, Rev. Am. Lith., p. 339, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40.

Foodplant: *Carya*; upper mine.

Tex.

bethunella Chambers, Can. Ent., III, p. 109, 1871; Cin. Quart. Jn. Sci., II, p. 103, 1875; Can. Ent., XI, p. 89, 1879; Dyar, Cat., No. 6326; Braun, Rev. Am. Lith., p. 340, pl. XXIV, fig. 3, 1908; Meyr., Gen.

Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 84, 1914.

syn: *lebertella* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 266, 1878; Dyar, Cat., No. 6327; Braun, Rev. Am. Lith., p. 340, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40.

Foodplant: *Quercus*; upper mine. U. S.

picturatella Braun, Ent. News., XXVII, p. 84, 1916.

Foodplant: *Myrica carolinensis*; upper mine. Conn., N. Y., N. J.
fasciella Wlsm., Ins. Life., III, p. 326, 1891; Dyar, Cat., No. 6317; Braun, Rev. Am. Lith., p. 341, pl. XXIV, fig. 4, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 89, 1914.

syn: *unijasciella* Chambers (not Tengström), Cin. Quart. Jn. Sci., II, p. 103, 1875; Braun, Rev. Am. Lith., p. 341, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40.

Foodplant: *Quercus*; upper mine. Ohio and Ky.

castaneella Chambers, Cin. Quart. Jn. Sci., II, p. 104, 1875; Dyar, Cat., No. 6318; Braun, Rev. Am. Lith., p. 341, pl. XXIV, fig. 5, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 88, 1914.

syn: *castanella* Wlsm., Ins. Life., III, p. 329, 1891; Braun, Rev. Am. Lith., p. 341, 1908.

syn: *castaneella* Meyr., Cat., p. 40.

Foodplants: *Quercus* and *Castanea*; upper mine. Ohio and Ky.

guttifinitella Clemens, Proc. Acad. Nat. Sci. Phil., p. 324, 1859; Tin. No. Am., pp. 65, 76, 1872; Chambers, Can. Ent., III, p. 110, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1874; Bull. Geol. Surv. Terr., IV, p. 102, 1878; Jn. Cin. Soc. Nat. Hist., II, p. 82, 1879; Busek, Proc. Ent. Soc. Wash., V, p. 189, 1903; Dyar, Cat., No. 6306; Braun, Rev. Am. Lith., p. 342; pl. XXIV, fig. 6, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 71, 1914.

syn: *toxicodendri* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 273, 1878; Dyar, Cat., No. 6304; Braun, Rev. Am. Lith., p. 342, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40.

Foodplant: *Rhus toxicodendron*. East. U. S.

obstrictella Clemens, Proc. Acad. Nat. Sci. Phil., p. 322, 1859; Tin. No. Am., pp. 64, 73, 1872; Chambers, Can. Ent., III, p. 183, 1871; Bull. Geol. Surv. Terr., IV, p. 102, 1878; Dyar, Cat., No. 6307; Braun, Rev. Am. Lith., p. 342, pl. XXIV, fig. 7, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 64, 1914.

syn: *bifasciella* Chambers, Bull. Geol. Surv. Terr., IV, p. 101, 119, 153, 1878; Dyar, Cat., No. 6329; Braun, Rev. Am. Lith., p. 342, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40.

syn: *ceriferae* Wlsm., Proc. U. S. Nat. Mus., XXXIII, p. 222, 1907;

Braun, Rev. Am. Lith., p. 342, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40.

Foodplant: *Quercus*; upper mine. N. Y., Pa., Ohio, Ky.

corylisella Chambers, Can. Ent., III, p. 111, 127, 1871; Dyar, Cat., No. 6308; Braun, Rev. Am. Lith., p. 344, pl. XXIV, fig. 8, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 69, 1914.

syn: *coryliella* Chambers, Can. Ent., XI, p. 90, 1879; Braun, Rev. Am. Lith., p. 344, 1908.

syn: *bifasciella* Wlsm., Proc. U. S. Nat. Mus., XXXIII, p. 223, 1907; Braun, Rev. Am. Lith., p. 344, 1908; Meyr., Gen. Ins., 128, p. 11, 1912.

syn: *corylella* Meyr., Meyr., Cat., p. 40.

Foodplant: *Corylus americana*; upper mine. East. U. S.

aesculicella Chambers, Can. Ent., III, p. 111, 1871; Wlsm., Ins. Life., II, p. 53, 1889; Busek, Proc. Ent. Soc. Wash., V, p. 190, 1903; Braun, Rev. Am. Lith., p. 344, pl. XXIV, fig. 9, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 70, 1914.

syn: *aesculella* Riley, Smith's List Lep. Bor. Am., p. 109, 1891; Braun, Rev. Am. Lith., p. 344, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40.

Foodplant: *Aesculus*; upper mine. Central U. S.

ostryarella Chambers, Can. Ent., III, p. 111, 1871; Tin. No. Am., p. 72, 1872; Dyar, Cat., No. 6335; Braun, Rev. Am. Lith., p. 345, pl. XXIV, fig. 10, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 40; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 68, 1914.

syn: *ostryella* Meyr., Meyr., Cat., p. 40.

Foodplants: *Ostrya virginiana* and *carpinus caroliniana*. East. U. S. **aceriella** Clemens, Proc. Acad. Nat. Sci. Phil., p. 325, 1859; Tin. No. Am., pp. 65, 75, 1872; Busek, Proc. Ent. Soc. Wash., V, p. 189, 1903; Dyar, Cat., No. 6305; Braun, Rev. Am. Lith., p. 346, pl. XXIV, fig. 11, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 66, 1914.

Foodplant: *Acer*; upper mine.

At1. States, Can.

hamamelicella Busek, Proc. Ent. Soc. Wash., V, p. 189, 1903; Braun, Rev. Am. Lith., p. 347, pl. XXIV, fig. 12, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 67, 1914.

syn: *hamamelis* Riley, Smith's List Lep. Bor. Am., 1903, No. 6844; Braun, Rev. Am. Lith., p. 347, 1908.

Foodplant: *Hamamelis virginiana*; upper mine.

At1. States.

tubiferella Clemens, Proc. Acad. Nat. Sci. Phil., p. 208, 1860; Tin. No. Am., p. 140, 1872; Chambers, Can. Ent., III, p. 165, 183, 1871; Wlsm. Ins. Life., II, p. 24, 77, 1889; III, p. 329, 1891; Busek, Proc. Ent. Soc.

Wash., V, p. 204, 1903; Dyar, Cat., No. 6330; Braun, Rev. Am. Lith., p. 347, pl. XXIV, fig. 13, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 117—, fig. 65, 1914.

Foodplant: *Quercus*; upper mine.

Atl. States.

PHYLLONORYCTER Hübner.

Tentamen 1806.

Type: *rayella* Linn.

fitchella Clemens, Proc. Acad. Nat. Sci. Phil., p. 207, 1860; Tin. No. Am., p. 139, 1872; Chambers, Can. Ent., III, p. 183, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1874; Packard, Guide Stud. Ins., p. 353, 1869; Chambers, Bull. Geol. Surv. Terr., III, p. 139, 1877; Can. Ent., XI, p. 90, 1879; Frey & Boll, Stett. ent. Zeit., XXXIX, p. 260, 1878; Busck, Proc. Ent. Soc. Wash., V, p. 204, 1903; Dyar, Cat., No. 6253; Braun, Rev. Am. Lith., p. 277, pl. XXI, fig. 1, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 26; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 14, 1914.

syn: *quercifoliella* Fitch, Fifth Rept. Ins. N. Y., p. 327, 1859; Braun, Rev. Am. Lith., p. 277, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

syn: *quercitorum* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 207, 1873; Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 346, 1875; Chambers, Cin. Quart. Jn. Sci., I, p. 201, 1874; II, p. 229, 1875; Bull. Geol. Surv. Terr., III, pp. 139, 141, 1877; Braun, Rev. Am. Lith., p. 277, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

Foodplant: *Quercus*; under mine.

East U. S.

leucothorax Wlsm., Proc. U. S. Nat. Mus., XXXIII, p. 223, 1907; Braun, Rev. Am. Lith., p. 278, pl. XXI, fig. 2, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Ent. News., XXVII, p. 83, 1916; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 13, 1914.

Calif.

bataviella Braun, Rev. Am. Lith., p. 278, pl. XXI, fig. 3, 1908; Meyr., Gen. Ins., 128, p. 10, 1912; Meyr., Cat., p. 38; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 58, 1914.

Ohio.

trinotella Braun, Ent. News., XIX, p. 99, 1908; Braun, Rev. Am. Lith., p. 279, pl. XXI, fig. 4, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 47, 1914.

N. J.

quercialbella Fitch, Fifth Rept. Ins. N. Y., p. 328, 1859; Chambers, Can. Ent., III, p. 57, 1871; Wlsm., Ins. Life., II, p. 25, 1889; III, p. 325, 1891; Dyar, Cat., No. 5259; Braun, Rev. Am. Lith., p. 279, pl. XXI, fig. 5, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 46, 1914.

syn: *quercibella* Chambers, Cin. Quart. Jn. Sci., II, p. 102, 1875; Wlsm., Ins. Life., II, p. 77, 1889; Braun, Rev. Am. Lith., p. 279, 1908.

syn: *quercipulchella* Chambers, Bull. Geol. Surv. Terr., IV, p. 120, 1878; Paekard, Bull. Ent. Comm., VII, p. 53, 1881; Wlsm., Ins. Life., II, p. 77, 1889; Braun, Rev. Am. Lith., p. 279, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

syn: *quercipulchrella* Riley, Smith's List Lep. Bor. Am., p. 109, 1891; Braun, Rev. Am. Lith., p. 279, 1908.

Foodplant: *Quercus*; under mine. East. U. S.

clemensella Chambers, Can. Ent., III, pp. 57, 85, 1871; XI, p. 91, 1879; Wlsm., Ins. Life., II, p. 25, 1889; Dyar, Cat., No. 6256; Braun, Rev. Am. Lith., p. 280, pl. XXI, fig. 6, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Act. Nat. Sci. Phil., XVI, pp. 116—, fig. 45, 1914.

Foodplant: *Acer saccharum*; under mine. Ohio.

argentifimbriella Clemens, Proc. Acad. Nat. Sci. Phil., pp. 318, 321, 1859; Tin. No. Am., pp. 39, 64, 70, 1872; Chambers, Can. Ent., III, pp. 57, 85, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1874; II, p. 229, 1875; Frey & Boll, Stett. ent. Zeit., XXXIV, p. 209, 1873; Wlsm., Ins. Life., III, p. 325, 1891; Busek, Proc. Ent. Soc. Wash., V, p. 188, 1903; Dyar, Cat., No. 6258; Braun, Rev. Am. Lith., p. 281; pl. XXI, fig. 7, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 43, 1914.

syn: *longistriata* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 209, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 229, 1875; Wlsm., Ins. Life., II, p. 325, 1891; Braun, Rev. Am. Lith., p. 281, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

syn: *longirostrata* Dyar, Bull. 52, U. S. Nat. Mus., 550, 1902; Braun, Rev. Am. Lith., p. 281, 1908.

syn: *fuscocostella* Chambers, Cin. Quart. Jn. Sci., II, p. 102, 1875; Wlsm., Ins. Life., II, p. 25, 1889; Braun, Rev. Am. Lith., p. 281, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

Foodplant: *Quercus*; under mine. East U. S.

lucidicostella Clemens, Proc. Acad. Nat. Sci. Phil., p. 318, 1859; Tin. No. Am., pp. 39, 64, 66, 1872; Chambers, Cin. Quart. Jn. Sci., II, p. 102, 1875; Can. Ent., III, p. 57, 1871; Busek, Proc. Ent. Soc. Wash., V, p. 187, 1903; Dyar, Cat., No. 6257; Braun, Rev. Am. Lith., p. 281, pl. XXI, fig. 8, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 44, 1914.

Foodplant: *Acer saccharum*. Centr. and North East U. S.

albanotella Chambers, Cin. Quart. Jn. Sci., II, p. 101, 1875; Dyar, Cat., No. 6263; Braun, Rev. Am. Lith., p. 282, pl. XXI, fig. 9, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 42, 1914.

syn: *subaureola* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 262, 1878; Wlsm., Ins. Life., II, p. 25, 1889; III, p. 325, 1891; Dyar, Cat., No. 6260; Braun, Rev. Am. Lith., p. 282, 1908; Meyr., Gen. Ins., 128, p. 5, 1912.

syn: *albinotella* Meyr., Cat., p. 27.

Foodplant: *Quercus*; under mine.

Ohio, Ky., Tex.

insignis Wlsm., Ins. Life., II, p. 117, 1889; Dyar, Cat., No. 6255; Braun, Rev. Am. Lith., p. 283, pl. XXI, fig. 10, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Ent. News., XXVII, p. 82, 1916; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 19, 1914.

Calif.

hageni Frey & Boll, Stett. ent. Zeit., XXXIV, p. 208, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 201, 1874; Bull. Geol. Surv. Terr., IV, p. 100, 1878; Dyar, Cat., No. 6252; Braun, Rev. Am. Lith., p. 284, pl. XXI, fig. 11, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 17, 1914.

syn: *necospinusella* Chambers, Bull. Geol. Sur. Terr., IV, p. 100, 1878; Can. Ent., XI, p. 144, 1879; Braun, Rev. Am. Lith., p. 284, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27.

Foodplant: *Quercus platanoides*; under mine.

East U. S.

arbutusella Braun, Rev. Am. Lith., p. 285, pl. XXI, fig. 12, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 18, 1914.

syn: *arbutella* Meyr., Cat., p. 27.

Foodplant: *Arbutus menziesii*.

Calif.

obscuricostella Clemens, Proc. Acad. Nat. Sci. Phil., p. 321, 1859; Tin. No. Am., pp. 64, 71, 1872; Chambers, Can. Ent., III, p. 85, 1871; XI, p. 92, 1879; Busek, Proc. Ent. Soc. Wash., V, p. 188, 1903; Braun, Rev. Am. Lith., p. 286, pl. XXI, fig. 13, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 25, 1914.

syn: *virginiella* Chambers, Can. Ent., III, p. 84, 1871; Dyar, Cat., No. 6280; Braun, Rev. Am. Lith., p. 286, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 27.

Foodplant: *Ostrya virginiana*; under mine.

At. States.

ostryaefoliella Clemens, Proc. Acad. Nat. Sci. Phil., p. 322, 1859; Tin. No. Am., pp. 64, 71, 1872; Chambers, Can. Ent., III, p. 85, 1871; Cin. Quart. Jn. Sci., I, p. 202, 1874; Can. Ent., XI, p. 91, 1879; Wlsm., Ins. Life., II, p. 53, 1889; Busek, Proc. Ent. Soc. Wash., V, p. 188, 1903; Dyar, Cat., No. 6275; Braun, Rev. Am. Lith., p. 286, pl. XXI, fig. 14, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 23, 1914.

syn: *mirifica* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 212, 1873; Braun, Rev. Am. Lith., p. 287, 1908; Meyr., Gen. Ins., 128, p. 6, 1912.

syn: *ostyrifoliella* Meyr., Meyr., Cat., p. 27.
 Foodplant: *Ostrya virginiana*; under mine. Atl. States.

rileyella Chambers, Cin. Quart. Jn. Sci., II, p. 236, 1875; Wlsm., Ins. Life, II, p. 25, 1889; Dyar, Cat., No. 6254; Braun, Rev. Am. Lith., p. 287, pl. XXI, fig. 15, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 28; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 22, 1914.
 syn: *tenuisbrigata* Frey & Boll, Stett. ent. Zeit., XXXVII, p. 225, 1876; XXXIX, p. 260, 1878; Braun, Rev. Am. Lith., p. 287, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 28.
 Foodplant: *Quercus*; under mine. Mo., Tex.

kearfottella Braun, Ent. News., XIX, p. 100, 1908; Braun, Rev. Am. Lith., p. 288, pl. XXI, fig. 10, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 28; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 26, 1914.
 Foodplant: *Castanea*; under mine. Wash., D. C., N. J., Ky.

caryaebella Chambers, Can. Ent., III, pp. 58, 85, 182, 206, 1871; Dyar, Cat., No. 6261; Braun, Rev. Am. Lith., p. 289, pl. XXI, fig. 17, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 21, 1914. Wis., Ky.
 syn: *caryaebella* Wlsm., Ins. Life., III, p. 328, 1891; Braun, Rev. Am. Lith., p. 289, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27. Wis., Ky.
olivaeformis Braun, Rev. Am. Lith., p. 289, pl. XXI, fig. 18, 1908; Meyr., Gen. Ins., 128, p. 5, 1912; Meyr., Cat., p. 27; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 24, 1914.
 syn: *oliviformis* Meyr., Meyr., Cat., p. 27.
 Foodplant: *Carya olivaeformis*.

martiella Braun, Rev. Am. Lith., p. 290, pl. XXI, fig. 19, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 33; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 52, 1914.
 Foodplant: *Betula*. Brit. Col.

gemmea Frey & Boll, Stett. ent. Zeit., XXXIV, p. 218, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 206, 1874; II, p. 227, 1875; Can. Ent., XI, p. 144, 1879; Wlsm., Ins. Life., II, p. 53, 1889; Dyar, Cat., No. 6266; Braun, Rev. Am. Lith., p. 290, pl. XXI, fig. 20, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 33; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 53, 1914.
 Foodplant: *Robinia pseudacacia*; upper mine. Mass.

diversella Braun, Ent. News., XXVII, p. 83, 1916.
 Foodplant: *Gaylussacia baccata*; *Oxydendrum arboreum*. Ohio.

morrisella Fitch, Rept. Ins. N. Y., V, p. 336, 1859; Chambers, Can. Ent., III, p. 183, 1871; Wlsm., Ins. Life, II, p. 52, 1889; Dyar, Cat., No. 6269; Braun, Rev. Am. Lith., p. 291; pl. XXI, fig. 21, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 33; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 110—, fig. 48, 1914.

syn: *texanella* Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 349, 1875; Frey & Boll, Stett. ent. Zeit., XXXIX, p. 275, 1878; Braun, Rev. Am. Lith., p. 291, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 33.

syn: *amphicarpaecella* Chambers, Bull. Geol. Surv. Terr., III, p. 137, 1877; Braun, Rev. Am. Lith., p. 291, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 33.

Foodplant: *Falcatia comosa*; under side. U. S.

uhlerella Fitch, Rept. Ins. N. Y., V, p. 337, 1859; Chambers, Can. Ent., III, p. 183, 1871; Wlsm., Ins. Life, II, p. 53, 1889; Dyar, Cat., No. 6268; Braun, Rev. Am. Lith., p. 291, pl. XXI, fig. 22, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 49, 1914.

Foodplant: *Amorpha fruticosa*; under mine. East and South U. S.

robinella Clemens, Proc. Acad. Nat. Sci. Phil., p. 318, 1859; p. 209, 1860; Tin. No. Am., p. 66, 1872; Chambers, Can. Ent., III, pp. 54, 87, 163, 183, 185, 1871; IV, pp. 9, 107, 1872; Cin. Quart. Jn. Sci., II, p. 228, 1875; Bull. Geol. Surv. Terr., III, p. 137, 1877; Jn. Cin. Soc. Nat. Hist., II, p. 91, 1879; Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 347, 1875; Frey & Boll. Stett. ent. Zeit., XXXIX, p. 275, 1878; Busck, Proc. Ent. Soc. Wash., V, p. 189, 1903; Dyar, Cat., No. 6267; Braun, Rev. Am. Lith., p. 292, pl. XXI, fig. 23, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 110—, fig. 50, 1914.

syn: *pseudacacia* Fitch, Rept. Ins. N. Y., V, p. 335, 1859; Braun, Rev. Am. Lith., p. 292, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32.

Foodplant: *Robinia pseudacacia*; upper and under mine. Atl. States. **auronitens** Frey & Boll, Stett. ent. Zeit., XXXIV, p. 216, 1873; Dyar, Cat., No. 6302; Braun, Rev. Am. Lith., p. 293, pl. XXI, fig. 24, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 10, 1914.

Foodplant: *Alnus serrulata*; under mine. Mass.

diaphanella Frey & Boll, Stett. ent. Zeit., XXXIX, p. 265, 1878; Dyar, Cat., No. 6277; Braun, Rev. Am. Lith., p. 294, pl. XXII, fig. 1, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 28, 1914.

Foodplant: *Quercus*; under mine. Tex.

minutella Frey & Boll, Stett. ent. Zeit., XXXIX, p. 263, 1878; Dyar, Cat., No. 6276; Braun, Rev. Am. Lith., p. 294, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32.

Foodplant: *Quercus rubra*; under mine. Texas.

scudderella Frey & Boll, Stett. ent. Zeit., XXXIV, V. 212, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 230, 1875; Bull. Geol. Surv. Terr., IV, p. 156, 1878; Can. Ent., XI, p. 72, 1879; VII, p. 126, 1875; Dyar, Cat., No. 6278; Braun, Rev. Am. Lith., p. 295, pl. XXII, fig. 2,

1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 35, 1914.

Foodplant: *Salix*; under mine.

Ohio.

ledella Wlsm., Ins. Life., II, p. 79, 1889; Dyar, Cat., No. 6292; Braun, Rev. Am. Lith., p. 206, pl. XXII, fig. 3, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 33, 1914.

Foodplant: *Ledum glandulosum*; upper mine.

Calif.

salicivorella Braun, Ent. News., XIX, p. 101, 1908; Braun, Rev. Am. Lith., p. 297, pl. XXII, fig. 4, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 29, 1914.

Foodplant: *Salix*; under mine.

N. J.

deceptusella Chambers, Can. Ent., XI, p. 73, 1879; Wlsm., Ins. Life., III, p. 328, 1891; Busek, Proc. Ent. Soc. Wash., V, p. 190, 1903; Braun, Rev. Am. Lith., p. 298, pl. XXII, fig. 5, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 30, 1914.

syn: *deceptella* Meyr., Meyr., Cat., p. 32.

Foodplant:

Ky.

alnicolella Wlsm., Ins. Life., II, p. 80, 1889; Dyar, Cat., No. 6273; Braun, Rev. Am. Lith., p. 298, pl. XXII, fig. 6, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 31; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 32, 1914.

Foodplant: *Alnus incana*; upper mine.

Calif.

alni Wlsm., Ins. Life., III, p. 326, 1891; Dyar, Cat., No. 6274; Braun, Rev. Am. Lith., p. 299, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 31; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 31, 1914.
syn: *alnivorella* Chambers, (not Ragonot), Cin. Quart. Jn. Sci., II, p. 302, 1875; Bull. Geol. Surv. Terr., III, p. 139, 1877; Braun, Rev. Am. Lith., p. 299, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 31.

Foodplant: *Alnus*; under mine.

malimalifoliella Braun, Ent. News., XIX, p. 101, 1908; Braun, Rev. Am. Lith., p. 300, pl. XXII, fig. 7, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 37, 1914.

syn: *maliolifoliella* Meyr., Meyr., Cat., p. 30.

Foodplants: *Malus*, *Crataegus*; under mine.

N. J., Ky., Ohio.

crataegella Clemens, Proc. Acad. Nat. Sci. Phil., p. 324, 1859; p. 208, 1860; Tin. No. Am., pp. 76, 141, 1872; Chambers, Can. Ent., III, pp. 55, 108, 1871; V, p. 50, 1873; XI, p. 73, 1879; Bull. Geol. Surv. Terr., IV, p. 100, 1878; Wlsm., Trans. Am. Ent. Soc., X, p. 202 1882; Busek, Proc. Ent. Soc. Wash., V, p. 190, 1903; Braun, Rev. Am. Lith., p. 301, pl. XXII, fig. 8, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 30; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 109—, fig. 36, 1914.

Foodplants: *Crataegus*, *Malus*, and *Prunus*; under mine. **East. U. S.**
propinquella Braun, Rev. Am. Lith., p. 302, pl. XXII, fig. 9, 1908;
 Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 30; Braun, Jn. Ac.
 Nat. Sci. Phil., XVI, pp. 116—, fig. 38, 1914.

Foodplant: *Prunus serotina*; under mine.

incanella Wlsm., Ins. Life., II, p. 81, 1889; Dyar, Cat., No. 6272; Braun,
 Rev. Am. Lith., p. 302, pl. XXII, fig. 10, 1908; Meyr., Gen. Ins.,
 128, p. 7, 1912; Meyr., Cat., p. 31; Braun, Jn. Ac. Nat. Sci. Phil.,
 XVI, pp. 116—, fig. 34, 1914.

Foodplant: *Alnus incana*; under mine and upper mine. **Calif.**

populiella Chambers, Bull. Geol. Surv. Terr., IV, p. 101, 1878; Dyer,
 Cat., No. 6331; Braun, Rev. Am. Lith., p. 303, pl. XXII, fig. 11,
 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 31; Braun,
 Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 27, 1914.

Foodplant: *Populus alba*; under mine. **Ohio, Ky.**

sexnotella Chambers, Jn. Cin. Soc. Nat. Hist., II, p. 189, 1879; Dyar,
 Cat., No. 6282; Braun, Rev. Am. Lith., p. 304, pl. XXII, fig. 12,
 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 29; Braun,
 Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 30, 1914. **Ky., Pa.**

aeriferella Clemens, Proc. Acad. Nat. Sci. Phil., p. 320, 1859; Tin. No.
 Am., pp. 64, 68, 1872; Chambers, Can. Ent., III, p. 183, 1871; Cin.
 Quart. Jn. Sci., II, p. 104, 1875; Busck, Proc. Ent. Soc. Wash. V,
 p. 187, 1903; Dyar, Cat., No. 6281; Braun, Rev. Am. Lith., p. 305,
 pl. XXII, fig. 13, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr.,
 Cat., p. 29; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 116—, fig. 40,
 1914.

Foodplant: *Quercus imbricaria*; under mine. **Pa., Ohio.**

obsoleta Frey & Boll, Stett. ent. Zeit., XXXIV, p. 211, 1873; Chambers,
 Cin. Quart. Jn. Sci., I, p. 202, 1874; Dyar, Cat., No. 6279; Braun,
 Rev. Am. Lith., p. 306, pl. XXII, fig. 14, 1908; Meyr., Gen. Ins., 128,
 p. 6, 1912; Meyr., Cat., p. 29; Braun, Jn. Ac. Nat. Sci. Phil., XVI,
 pp. 116—, fig. 41, 1914.

syn: *obsoletella* Chambers, Bull. Geol. Surv. Terr., IV, p. 155, 1878;
 Braun, Rev. Am. Lith., p. 306, 1908. **Mass.**

argentinotella Clemens, Proc. Acad. Nat. Sci. Phil., p. 321, 1859; Tin.
 No. Am., pp. 66, 78, 1872; Chambers, Can. Ent., III, p. 148, 1871;
 XI, p. 89, 1879; Frey & Boll, Stett. ent. Zeit., XXXIV, p. 213,
 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 202, 1874; II, p. 101, 1875;
 Busck, Proc. Ent. Soc. Wash., V, p. 190, 1903; Dyar, Cat., No. 6283;
 Braun, Rev. Am. Lith., p. 306, pl. XXII, fig. 15, 1908; Meyr., Gen.
 Ins., 128, p. 7, 1912; Meyr., Cat., p. 31; Braun, Jn. Ac. Nat. Sci.
 Phil., XVI, pp. 115—, fig. 11, 1914.

Foodplant: *Ulmus*; under mine. **East. U. S.**

occitanica Frey & Boll, Stett. ent. Zeit., XXXVII, p. 224, 1876; XXXIX,
 p. 270, 1878; Dyar, Cat., No. 6284; Braun, Rev. Am. Lith., p. 307,

1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 31; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 12, 1914.

Foodplant: *Ulmus fulva*; under mine. Tex.

apicinigrella Braun, Rev. Am. Lith., p. 307, pl. XXII, fig. 16, pl. XXIV, fig. 23, 1908; Meyr., Gen. Ins., 128, p. 7, 1912; Meyr., Cat., p. 32; Braun, Jn. Ac. Nat. Sci. Phil., XVI, 114—, figs. 55a, 55b, 1914.

Foodplant: *Salix*; under mine. Calif., Wash.

basistrigella Clemens, Proc. Acad. Nat. Sci. Phil., p. 321, 1859; Tin. No. Am., pp. 39, 65, 69, 1872; Chambers, Can. Ent., III, p. 148, 166, 182, 1871; Cin. Quart. Jn. Sci., I, p. 205, 1874; Wlsm., Ins. Life., II, p. 25, 1889; Busek, Proc. Ent. Soc. Wash., V, p. 188, 1903; Dyar, Cat., No. 6301; Braun, Rev. Am. Lith., p. 308, pl. XXII, fig. 17, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 28; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 57, 1914.

syn: *intermedia* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 210, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 230, 1875; Braun, Rev. Am. Lith., p. 308, 1908; Meyr., Gen. Ins., 128, p. 6, 1912; Meyr., Cat., p. 28.

Foodplant: *Quercus*; under mine. Calif. and Ore.

celtisella Chambers, Can. Ent., III, p. 129, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1874; Bull. Geol. Surv. Terr., IV, p. 117, 1878; Frey & Boll, Stett. ent. Zeit., XXXIX, p. 274, 1878; Chambers, Jn. Cin. Soc. Nat. Hist., II, p. 190, 1879; Wlsm., Ins. Life., II, p. 52, 1889; Braun, Rev. Am. Lith., p. 309, pl. XXII, fig. 18, 1908; Meyr., Gen. Ins., 128, p. 9, 1912; Meyr., Cat., p. 37; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 56, 1914.

syn: *nonfasciella* Chambers, Can. Ent., III, p. 108, 1871; Cin. Quart. Jn. Sci., I, p. 201, 1874; Braun, Rev. Am. Lith., p. 309, 1908; Meyr., Gen. Ins., p. 9, 1912; Meyr., Cat., p. 37.

syn: *pusillifoliella* Frey & Boll, Stett. ent. Zeit., XXXVII, p. 226, 1876; Stett. ent. Zeit., XXXIX, p. 274, 1878; Braun, Rev. Am. Lith., p. 309, 1908; Meyr., Gen. Ins., 128, p. 9, 1912; Meyr., Cat., p. 37.

syn: *celtiella* Meyr., Meyr., Cat., p. 37.

Foodplant: *Celtis occidentalis*; first under, then upper mine.

Ky., Ohio.

lucetiella Clemens, Proc. Acad. Nat. Sci. Phil., pp. 319, 322, 1859; Tin. No. Am., pp. 65, 73, 1872; Chambers, Can. Ent., III, p. 56, 1871; Wlsm., Ins. Life., II, p. 52, 1889; Busek, Proc. Ent. Soc. Wash., V, p. 188, 1903; Dyar, Cat., No. 6262; Braun, Rev. Am. Lith., p. 310, pl. XXII, fig. 19, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 51, 1914.

syn: *aenigmatella* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 219, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 210, 1874; Braun, Rev.

Am. Lith., p. 310, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

Foodplant: *Tilia americana*; under mine. Atl. States.

symporicarpella Chambers, Cin. Quart. Jn. Sci., II, p. 98, 1875; Dyar, Cat., No. 6311; Braun, Rev. Am. Lith., p. 311, pl. XXII, fig. 20, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 114—, fig. 54, 1914.

syn: *symporicarpella* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 271, 1878; Braun, Rev. Am. Lith., p. 311, 1908.

syn: *bolliella* Dyar, Cat., No. 6312; Braun, Rev. Am. Lith., p. 311, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

Foodplant: *Symporicarpos*; under mine. Ohio, Ky., Texas.

osten sackenella Fitch, Rept. Ins. N. Y., V, p. 338, 1859; Chambers, Can. Ent., III, p. 183, 1871; Dyar, Cat., No. 6265; Braun, Rev. Am. Lith., p. 311, pl. XXII, fig. 21, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 110—, fig. 7, 1914.

syn: *ornatella* Chambers, Can. Ent., III, p. 161, 1871; IV, p. 107, 1872; XI, p. 91, 1879; Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 347, 1875; Frey & Boll, Stett. ent. Zeit., XXXIV, p. 217, 1873; Wlsm., Ins. Life., II, p. 53, 1889; Braun, Rev. Am. Lith., p. 311, pl. XXII, fig. 21, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

Foodplant: *Robinia*; upper and under mine. East. U. S.

tritaenianella Chambers, Can. Ent., III, pp. 110, 184, 1871; V, p. 48, 1873; XI, p. 89, 1879; Wlsm., Ins. Life., II, p. 53, 1889; Braun, Rev. Am. Lith., p. 312, pl. XXII, fig. 22, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 112—, fig. 5, 1914.

syn: *tritaenella* Dyar, Cat., No. 6316; Braun, Rev. Am. Lith., p. 312, 1908; Meyr., Cat., p. 34.

syn: *consimilella* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 214, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 202, 1874; II, p. 130, 1875; Wlsm., Ins. Life., II, p. 51, 1889; Braun, Rev. Am. Lith., p. 312, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

Foodplant: *Ostrya virginiana*; upper mine. Atl. States.

affinis Frey & Boll, Stett. ent. Zeit., XXXVII, p. 222, 1876; XXXIX, p. 270, 1878; Wlsm., Ins. Life., II, p. 51, 1889; Dyar, Cat., No. 6314; Braun, Rev. Am. Lith., p. 313, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 112—, fig. 6, 1914.

Foodplants: *Lonicera* and *Symporicarpos*; under mine. Tex.

mariæella Chambers, Cin. Quart. Jn. Sci., II, p. 99, 1875; Can. Ent., XI, p. 92, 1879; Wlsm. Trans. Am. Ent. Soc., X, p. 201, 1882; Dyar Cat., No. 6315; Braun, Rev. Am. Lith., p. 313, pl. XXII, fig. 23

1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn., Ac. Nat. Sci. Phil., XVI, pp. 113—, fig. 8, 1914.

syn: *mariella* Riley, Smith's List Lep. Bor. Am., p. 190, 1891; Braun, Rev. Am. Lith., p. 313, 1908; Meyr., Cat., p. 34.

Foodplant: *Symporicarpos vulgaris*; under mine. Mo.

tiliacella Chambers, Can. Ent., III, p. 56, 1871; Dyar, Cat., No. 6310; Braun, Rev. Am. Lith., p. 314, pl. XXII, fig. 24, 1908; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 111—, fig. 1, 1914.

syn: *tiliacella* Chambers, Cin. Quart. Jn. Sci., I, p. 203, 1874; Braun, Rev. Am. Lith., p. 314, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

syn: *tiliella* Wlsm., Ins. Life., III, p. 328, 1891; Braun, Rev. Am. Lith., p. 314, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34.

Foodplant: *Tilia americana*; upper mine. Atl. States.

oregonensis Wlsm., Ins. Life., II, p. 117, 1889; Dyar, Cat., No. 6309; Braun, Rev. Am. Lith., p. 314, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 112—, fig. 2, 1914. Ore.

fragilella Frey & Boll, Stett. ent. Zeit., XXXIX, p. 270, 1878; Wlsm. Ins. Life., II, p. 51, 1889; Dyar, Cat., No. 6313; Braun, Rev. Am. Lith., p. 315, pl. XXIII, fig. 1, 1908; Meyr., Gen. Ins., 128, p. 8, 1912; Meyr., Cat., p. 34; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 112—, fig. 3, 1914.

syn: *trifasciella* Frey & Boll, (not Haworth), Stett. ent. Zeit., XXXIV, p. 215, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 205, 1874; Wlsm., Ins. Life., III, p. 326, 1891; Braun, Rev. Am. Lith., p. 315, 1908.

Foodplant: *Lonicera*; under mine. East, U. S.

salicifoliella Clemens, Proc. Ent. Soc. Phil., I, p. 81, 1861; Tin. No. Am., p. 169, 1872; Packard, Guide Stud. Ins., p. 353, 1869; Chambers Can. Ent., III, pp. 163, 185, 1871; Cin. Quart. Jn. Sci., II, p. 302, 1875; Can. Ent., VII, p. 126, 1875; Bull. Geol. Surv. Terr., III, p. 139, 1877; Wlsm., Ins. Life., II, p. 54, 1889; Dyar, Cat., No. 6333; Braun, Rev. Am. Lith., p. 316, pl. XXIII, figs. 2, 3, pl. XXIV, fig. 24, 1908; Meyr., Gen. Ins., 128, p. 9, 1912; Meyr., Cat., p. 37; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 15, 1914.

syn: *atomariella* Zeller, Verh. zool-bot. Ges. Wien., XXV, p. 350, 1875; Wlsm., Ins. Life., II, p. 54, 1889; Dyar, Cat., No. 6332; Braun, Rev. Am. Lith., p. 316, 1908; Meyr., Gen. Ins., 128, p. 9, 1912.

Foodplants: *Salix* and *Populus*; under mine. U. S.

tremuloidiella Braun, Ent. News., XLIX, p. 102, 1908; Braun, Rev. Am. Lith., p. 317, pl. XXIII, fig. 4, 1908; Meyr., Gen. Ins., 128, p. 9, 1912; Meyr., Cat., p. 37; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 115—, fig. 16, 1914.

Foodplant: *Populus tremuloides*; under mine. Brit. Co¹.

celtifoliella Chambers, Can. Ent., III, p. 128, 1871; Bull. Geol. Surv. Terr., IV, p. 118, 1878; Wlsm., Ins. Life., II, p. 52, 1889; Dyar, Cat., No. 6286; Braun, Rev. Am. Lith., p. 319, pl. XXIII, fig. 5, 1908; Meyr., Gen. Ins., 128, p. 9, 1912; Meyr., Cat., p. 37; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 112—, fig. 4, 1914.

Foodplant: *Celtis occidentalis*; under mine. Ky., Ohio, W. Va.
lysimachiaeella Chambers, Cin. Quart. Jn. Sci., II, p. 100, 1875; Wlsm., Ins. Life., II, p. 77, 1889; Dyar, Cat., No. 6336; Braun, Rev. Am. Lith., p. 320, 1908.

Foodplant: *Lysimachia lanceolata*; under mine. (Larva described, adult not known.)

CREMASTOBOMBYCIA Braun.

Rev. Am. Lith., p. 349, pl. XX, figs. 6, 7, 13, 1908.

Type: *solidaginis* Frey & Boll.

grindeliella Wlsm., Ins. Life., III, p. 327, 1891; Dyar, Cat., No. 6299; Braun, Rev. Am. Lith., p. 350, pl. XXIV, figs. 16, 22, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 157—, fig. 59a, 59b, 1914.

Foodplant: *Grindelia robusta*; upper or lower mine. Calif.

solidaginia Frey & Boll, Stett. ent. Zeit., XXXVII, p. 223, 1876; Dyar, Cat., No. 6298; Braun, Rev. Am. Lith., p. 351, pl. XXIV, fig. 17, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 124—, fig. 60, 1914.

syn: *solidaginisella* Chambers, Jn. Cin. Soc. Nat. Hist., II, p. 190, 1880; Braun, Rev. Am. Lith., p. 351, 1908.

Foodplant: *Solidago*; under mine. U. S.

ambrosiella Chambers, Can. Ent., III, p. 127, 1871; Cin. Quart. Jn. Sci., II, p. 100, 1875; Frey & Boll, Stett. ent. Zeit., XXXVII, p. 221, 1876; XXXIX, p. 267, 1878; Wlsm., Ins. Life., II, p. 54, 1889; Dyar, Cat., No. 6321; Braun, Rev. Am. Lith., p. 352, pl. XXIV, fig. 18, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 157—, fig. 61, 1914.

syn: *amoena* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 269, 1878; Dyar, Cat., No. 6285; Braun, Rev. Am. Lith., p. 352, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

Foodplants: *Ambrosia* and *Verbesina*; under mine. Atl. States, Tex.

ignota Frey & Boll, Stett. ent. Zeit., XXXIV, p. 215, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 206, 1874; II, p. 230, 1875; Wlsm., Ins. Life., II, pp. 54, 119, 1889; Dyar, Cat., No. 6320; Braun, Rev. Am. Lith., p. 353, pl. XXIV, figs. 19, 20, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 124—, fig. 62, 1914.

syn: *bostonica* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 216, 1873; Chambers, Cin. Quart. Jn. Sci., I, p. 206, 1874; Dyar, Cat., No. 6319; Braun, Rev. Am. Lith., p. 353, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

syn: *helianthisella* Chambers, Cin. Quart. Jn. Sci., I, p. 205, 1874; Braun, Rev. Am. Lith., p. 353, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

syn: *helianthivorella* Chambers, Cin. Quart. Jn. Sci., II, p. 100, 1875; Braun, Rev. Am. Lith., p. 353, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

syn: *elephantopodella* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 268, 1878; Busek, Proc. U. S. Nat. Mus., XXIII, p. 247, 1900; Dyar, Cat., No. 6322; Braun, Rev. Am. Lith., p. 353, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

syn: *actinomeridis* Frey & Boll, Stett. ent. Zeit., XXXIX, p. 268, 1878; Dyar, Cat., No. 6324; Braun, Rev. Am. Lith., p. 353, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41.

Foodplants: *Verbesina*, *Elephantopus*, *Helianthus*; under mine.

Atl. States, Tex.

verbesinella Busck, Proc. U. S. Nat. Mus., XXIII, p. 246, 1900; Dyar, Cat., No. 6323; Braun, Rev. Am. Lith., p. 354, pl. XXIV, fig. 21, 1908; Meyr., Gen. Ins., 128, p. 11, 1912; Meyr., Cat., p. 41; Braun, Jn. Ac. Nat. Sci. Phil., XVI, pp. 157—, fig. 63, 1914.

Foodplant: *Verbesina virginica*; under mine.

Fla.

MARMARA Clemens.

Proc. Ent. Soc. Phil., II, p. 6, 1863.

Type: *salicella* Clem.

Aesyle, Chambers, Cin. Quart. Jn. Sci., II, p. 98, 1875.

Type: *Marmara fasciella*, Cham.

salicella Clemens, Proc. Ent. Soc. Phil., II, p. 7, 1863; Tin. No. Am., p. 212, 1872; Dyar, Cat., No. 6403; Busek, Jn. N. Y. Ent. Soc., X, p. 98, 1902; Proc. U. S. Nat. Mus., XXIII, p. 246, 1900; Proc. Ent. Soc. Wash., V, p. 210, 1903; Meyr., Gen. Ins., 128, p. 12, 1912; Meyr., Cat., p. 42.

syn: *Salicella* Cham., Bull. Geol. Surv. Terr., IV, p. 156, 1878.

Foodplant: *Salix*. Atl. States.

serotinella Busck, Proc. Wash. Ent. Soc., XVII, p. 89, 1915.

Foodplant: *Prunus serotina*.

Va.

guilandinella Busck, Proc. U. S. Nat. Mus., XXIII, p. 245, 1900; Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

syn: *guilandinæ* Dyar, Cat., No. 6404.

Foodplant: *Guilandina bonduc* a.

Fla.

fulgidella Clemens, Proc. Acad. Nat. Sci. Phil., p. 6, 1860; Proc. Ent. Soc. Phil., V, p. 145, 1865; Tin. No. Am., p. 92, 1872; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Lyar, Cat., No. 6357; Meyr., Gen. Ins., p. 26, 1912; Meyr., Cat., p. 54.

Foodplants: *Quercus* and *Castanea*.

At1. States.

elotella Busek, Proc. Wash. Ent. Soc., XI, p. 102, 1909; Meyr., Gen. Ins., p. 26, 1912; Meyr., Cat., p. 54; Busek, Proc. Wash. Ent. Soc., XV, p. 150, 1913.

Foodplant: *Malus*.

Conn., Mass.

opuntiella Busek, Proc. Ent. Soc. Wash., IX, p. 97, 1907; Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

Foodplant: *Opuntia*.

Tex.

arbutiella Busek, Proc. U. S. Nat. Mus., XXVII, p. 772, 1904; Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

Foodplant: *Arbutus menziesii*.

Wash., Ore.

fasciella Chambers, Cin. Quart. Jn. Sci., II, p. 98, 1875; Can. Ent., VII, p. 93, 1875; IX, pp. 123, 194, 1877; XI, p. 118, 1879; Wlsm., Trans. Am. Ent. Soc., X, p. 201, 1882; Dyar, Cat., No. 6356; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

Syn: *quinquenotella* Chambers, Can. Ent., IX, p. 124, 1877; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

At1. States.

pomonella Busek, Proc. Wash. Ent. Soc., XVII, p. 89, 1915.

Foodplant: *Malus*.

Ore.

(*) **aura tella** Braun, Can. Ent., XLVII, p. 192, 1915.

Foodplant: *Rudbeckia laciniata*.

Ohio.

(*) **apocynella** Braun, Can. Ent., XLVII, p. 193, 1915.

Foodplant: *Apocynum cannabinum*.

Ohio.

(*) **Smilacella** Braun, Ent. News., Phil., XX, p. 432, 1909; Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

Syn: *Smilacella* Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

Foodplant: *Smilax hispida*.

Ky., Ohio.

LEUCANTHIZA Clemens.

Proc. Acad. Nat. Sci. Phil., p. 327, 1859.

Type: *Leucanthiza amphicarpeaefoliella* Clem.

amphicarpeaefoliella Clemens, Proc. Acad. Nat. Sci. Phil., p. 327, 1859; Tin. No. Am., p. 85, 1872; Chambers, Can. Ent., III, p. 162, 1871; Dyar, Cat., No. 6402; Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42; Busek, Proc. Ent. Soc. Wash., V, p. 191, 1903.

syn: *saundersella* Chambers, Can. Ent., III, p. 205 1871; Meyr. Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

syn: *amphicarpeifoliella* Meyr., Gen. Ins., p. 12, 1912; Meyr., Cat., p. 42.

Foodplant: *Amphicarpa monoica*.

At1. States.

(*) *dircella* Braun, Ent. News., XXV, p. 115, 1914.

Foodplant: *Dirca palustris*.

Ohio.

NEUROLIPA Nov. Gen.

Type: *Neurolipa randiella* Busek.

randiella Busek, Proc. U. S. Nat. Mus., XXIII, p. 247, 1900; Dyar, Cat., No. 6399; Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49.

Foodplant: *Randia aculeata*.

Fla.

APOPHTHISIS Braun

Can. Ent., XLVII, p. 190, 1915.

(*) Type: *Apophthysis pullata* Braun, Can. Ent., XLVII, p. 191, 1915.

LEUCOSPILAPTERYX Spuler.

Schmett., Eur. B. 2, p. 408, 1910.

Type: *Leucospilapteryx omissella*, Stainton.

venustella Clemens, Proc. Ac. Nat. Sci. Phil., p. 6, 1860; Proc. Ent. Soc. Phil., II, p. 10, 1863; V, p. 145, 1865; Tin. No. Am., pp. 92, 216, 269, 1872; Dyar, Cat., No. 6375; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

syn *eupatoriella* Chambers, Can. Ent., IV, p. 9, 1872; V, pp. 44, 46, 1873; Dyar, Cat., No. 6375; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

Foodplant: *Eupatorium agratoides*.

Atl. States.

CHILOCAMPYLA Busek.

Proc. U. S. Nat. Mus., XXIII, p. 248, pl. 1, fig. 15, 1900.

Type: *Chilocampyla dyariella* Busek.

dyariella Busek, Proc. U. S. Nat. Mus., XXIII, p. 249, 1900; Dyar, Cat., No. 6339; Meyr., Gen. Ins., p. 25, 1912; Meyr., Cat., p. 53.

Foodplant: *Eugenia garbari*.

Fla.

NEUROSTROTA Ely.

Type: *Neurostrota gunniella* Busek.

gunniella Busek, Proc. U. S. Nat. Mus., XXX, p. 731, 1906; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

Tex.

ACROCERCOPS Wallengren.

Ent. Tidskr., II, p. 95, 1881.

Type: *Acrocercops brogniardellum* Fabr.

— *Dialectica* Wlsm., Proc. Zool. Soc. Lond., p. 150, 1897.

Type: *Acrocercops scalariella* Zell.

— *Eutrichocnemis* Spuler, Schmett., Eur. Band 2, p. 409, 1910.

Type: *Acrocercops scalariella* Zell.

albinatella Chambers, Can. Ent., IV, p. 25, 1872; Dyar, Cat., No. 6396; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.
 syn: *albanotella* Chambers, Can. Ent., IX, p. 123, 1877; Cin. Quart. Jn. Sci., I, p. 200, 1874; Bull. Geol. Surv. Terr., III, p. 132, 1877.
 syn: *albinotella* Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.
 Foodplant: *Quercus*. Ky., Md., N. Y.
quinquestrigella Chambers, Can. Ent., VII, p. 75, 1875; IX, pp. 14, 124, 1877; X, p. 109, 1878; Dyar, Cat., No. 6398; Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49. Ky., Tex.
rhombiferellum Frey & Boll, Stett. ent. Zeit., XXXVII, p. 212, 1876; Dyar, Cat., No. 6400; Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49.
 syn: *rhombiferella* Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49. Tex.
astericola Frey & Boll, Stett. ent. Zeit., XXXIV, p. 204, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 200, 1875; Dyar, Cat., No. 6345; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.
 Foodplant: *Aster cordifolius*. Mass., Pa.
 (†) **strigosa** Braun, Ent. News., Phil., XXV, p. 116, 1914. Ky., N. C.
 Foodplant: *Quercus prinus*.
cnosmodiella Busek, Proc. U. S. Nat. Mus., XXV, p. 409, 1902; Meyr., Gen. Ins., p. 15, 1912; Meyr., Cat., p. 43.
 syn: *pnosmodiella* Busek, Proc. U. S. Nat. Mus., XXV, p. 409, 1902; Dyar, Cat., No. 6385.
 Foodplant: *Onosmodium carolinianum*. Col.
 (†) **sideroxylonella** Busek, Proc. U. S. Nat. Mus., XXIII, p. 250, 1900; Meyr., Gen. Ins., p. 18, 1912; Meyr., Cat., p. 46.
 syn: *sideroxylella* Meyr., Gen. Ins., p. 18, 1912; Meyr., Cat., p. 46.
 Foodplant: *Sideroxylon pallidum*. Fla.

NEUROBATHRA Ely.

Type: *Neurobathra strigifinitella* Clem., Proc. Ac. Nat. Sci. Phil., p. 6, 1860,
strigifinitella Clemens, Proc. Ac. Nat. Sci. Phil., p. 6, 1860; Tin. No. Am., p. 92, 1872; Dyar, Cat., No. 6370; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Meyr., Gen. Ins., p. 17, 1912; Meyr., Cat., p. 45; Heinrich and DeGryse, Proc. Ent. Soc. Wash., XVII, p. 6, 1915. *
 syn: *duodecemlineella* Chambers, Can. Ent., IV, p. 11, 1872; Dyar, Cat., No. 6371; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Meyr., Cat., p. 45.
 (*) syn: *quercifoliella* Chambers, Cin. Quart. Jn. Sci., II, p. 116, 1875; Dyar, Cat., No. 6393; Busek, Proc. Ent. Soc. Wash., V, p. 195, 1903; Meyr., Cat., p. 45.
 Foodplants: *Quercus*, *Castanea* and *Fagus*. Atl. States.

MICRURAPTERYX Spuler.

Schinett., Eur. B. 2, p. 409, 1910.

Type: *Micrurapteryx kollarieella* Zell.

salicifoliella Chambers, Can. Ent., IV, p. 25, 1872; V, pp. 15, 46, 186, 1873; Cin. Quart. Jn. Sci., I, p. 340, 1874; Dyar, Cat., No. 6365; Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49.

Foodplant: *Salix*.

Atl. States.

PARECTOPA Clemens.

Proc. Acad. Nat. Sci. Phil., p. 210, 1860.

Type: *Parectopa lespedezaefoliella* Clem.

lespedezaefoliella Clemens, Proc. Acad. Nat. Sci. Phil., p. 210, 1860; Tin. No. Am., p. 144, 1872; Chambers, Can. Ent., IV, p. 7, 1872; V, p. 47, 1873; VIII, p. 19, 1876; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6364; Busck, Proc. Ent. Soc. Wash., V, p. 205, 1903.

syn: *lespedeziolica* Meyr., Gen. Ins., 120, p. 20, 1912; Meyr., Cat., p. 48.

syn: *mirabilis* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 203, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 227, 1875; Meyr., Gen. Ins., 128, p. 20, 1912; Meyr., Cat., p. 48; Busck, Proc. Ent. Soc. Wash., V, p. 205, 1903.

Foodplant: *Lespedeza violacea*.

Atl. States.

robinella Clemens, Proc. Ent. Soc. Phil., II, p. 4, 1863; Tin. No. Am., p. 207, 1872; Chambers, Can. Ent., III, p. 87, 1871; IV, p. 7, 1872; V, p. 47, 1873; VIII, p. 33, 1876; Bull. Geol. Surv. Terr., III, p. 132, 1877; Wlsm., Trans. Am. Ent. Soc., X, p. 193, 1882; Dyar, Cat., No. 6364; Meyr., Gen. Ins., 128, p. 20, 1912; Meyr., Cat., p. 48; Busck, Proc. Ent. Soc. Wash., V, p. 210, 1903.

Foodplant: *Robinia pseudacacia*.

Atl. States.

pennsylvaniella Engel, Ent. News, XVIII, p. 278, 1907; Meyr., Gen. Ins., 128, p. 20, 1912; Meyr., Cat., p. 49; Braun, Ent. News., XXV, p. 117, 1914.

Foodplant: *Aster cordifolius*.

Ohio, Pa., Conn.

(†) **plantaginisella** Chambers, Can. Ent., IV, p. 10, 1872; V, p. 46, 1873; Dyar, Cat., No. 6353; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.

syn: *geiella*, Chambers, Cin. Quart. Jn. Sci., I, p. 200, 1874; Dyar, Cat., No. 6353; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.

syn: *erigeronella* Chambers, Can. Ent., IX, p. 127, 1877; Bull. Geol. Surv. Terr., IV, p. 148, 1878; Dyar, Cat., No. 6353; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.

syn: *plantaginella* Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.

Foodplant: *Eriigeron*.

Ky.

(†) **thermopsella** Chambers, Cin. Quart. Jn. Sci., II, p. 300, 1875; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Proc. U. S. Nat. Mus., XXV, p. 409, 1902; Dyar, Cat., No. 6374; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 48.

Foodplant: *Thermopsis montana*.

Col.

bosquella Chambers, Can. Ent., VIII, p. 33, 1876; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6350; Meyr., Gen. Ins., p. 20, 1912; Meyr., Cat., p. 49.

Tex.

(*) **interpositella** Frey & Boll., Stett. ent. Zeit., XXXVII, p. 211, 1876; Dyar, Cat., No. 6381; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

Tex.

PARORNIX Spuler.

Schmett., Eur., B. 2, p. 410, 1910.

Type: *Parornix anglicella* Stainton.

= *Ornix* Treitschke, Schmett., Eur., IX (2), p. 192, 1833. (See Walsingham, Biol. Centr. Am., p. 341, 1915.)

(*) **boreasella** Clemens, Proc. Ent. Soc. Phil., II, p. 415, 1864; Tin. No. Am., p. 237, 1872; Dyar, Cat., No. 6389; Busck, Proc. Ent. Soc. Wash., p. 215, 1903; Meyr., Gen. Ins., p. 17, 1912; Meyr., Cat., p. 45. syn: *boreella* Meyr., Gen. Ins., p. 17, 1912; Meyr., Cat., p. 45.

Labrador.

guttea Haw, Lep. Brit., p. 531, 1828; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 290, 1907; Meyr., Gen. Ins., p. 23, 1912; Meyr., Cat., p. 50.

?syn: *solitariella* Dietz, Trans. Am. Ent. Soc., XXXIII, p. 290, pl. 4, fig. 1, 1907; Meyr., Gen. Ins., p. 23, 1912; Meyr., Cat., p. 50.

Foodplant: *Malus*.

Europe, U. S.

kalmiella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 291, pl. IV, fig. 3, 1907; Meyr., Gen. Ins., p. 23, 1912; Meyr., Cat., p. 51.

Foodplant: *Kalmia angustifolia*.

Pa., Conn.

preciosella Dietz, Trans. Am. Ent. Soc. Phil., XXXIII, p. 291, pl. IV, fig. 2, 1907; Meyr., Gen. Ins., p. 23, 1912; Meyr., Cat., p. 51.

Foodplant: *Vaccinium corymbosum*.

Pa., Conn.

crataegifoliella Clemens, Proc. Acad. Nat. Sci. Phil., p. 8, 1860; Tin. No. Am., p. 94, 1872; Cham., Can. Ent., V, p. 48, 1873; Busck, Proc. Ent. Soc. Wash., V, p. 215, 1903; Dyar, Cat., No. 6388; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 292, 1907; Braun, Ent. News., XX, p. 431, 1909; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.

Foodplant: *Crataegus tomentosa*.

Atl. States.

dubitella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 292, pl. IV, fig. 4, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.

Pa.

conspicuella Dietz, Trans. Am. Ent. Soc., XXIII, p. 293, pl. IV, fig. 5, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.
 Foodplant: *Betula nigra*. Pa.

arbitrella Dietz, Trans. Am. Ent. Soc., XXIII, p. 293, pl. IV, fig. 6, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.
 Foodplant: *Vaccinium corymbosum*. Pa.

vicinella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 296, pl. IV, fig. 8, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplant: *Betula flava*. Pa.

strobivorella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 296, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplant: *Sorbus*. Pa.

arbutifolia Dietz, Trans. Am. Ent. Soc., XXXIII, p. 296, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplant: *Pyrus arbutifolia*. Pa.

obliteratella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 297, pl. IV, fig. 10, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplant: *Betula nigra*. Pa.

inusatatumella Chambers (Braun), Can. Ent., V, p. 47, 1873; VIII, p. 19, 1876; Dyar, Cat., No. 6392; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 289, 1907; Braun, Ent. News., XX, p. 431, 1909; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.
 syn: *inusatella* Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.
 Foodplant: *Crataegus mollis*. Ky., Ohio.

melanotella Dietz, Trans. Am. Ent. Soc., XXXIII, p. 293, pl. IV, fig. 7, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52.
 Foodplant: *Crataegus*. Pa.

geminatella Packard, Guide Stud. Ins., p. 353, 1869; Chambers, Can. Ent., III, p. 183, 1871; Dyar, Cat., No. 6387; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 295, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 syn: *prunivorella* Chambers, Can. Ent., V, p. 50, 1873; Cin. Quart. Jn. Sci., II, p. 301 1875; Bull. Geol. Surv. Terr., III, pp. 133, 141, 1877; psyche, III, p. 67, 1880; Wlsm., Trans. Am. Ent. Soc., X, p. 194, 1882; Dyar, Cat., No. 6378; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 295, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplants: *Malus* and "wild cherry." Mo., North Atl. States.

quadripunctella Clemens (Dietz), Proc. Ent. Soc. Phil., I, p. 86, 1861; Tin. No. Am., p. 177, 1872; Dyar, Cat., No. 6395; Dietz, Trans. Am. Ent. Soc., XXXIII, p. 295, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 53.
 Foodplants: *Pyrus arbutifolia* and *Malus*. Atl. States.

?syn: *albifasciella* Dietz, Trans. Am. Ent. Soc., XXXIII, p. 295, 1907; Meyr., Cat., p. 53. Pa.

innotata Wlsm., Proc. U. S. Nat. Mus., XXXIII, p. 224, 1907; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52. U. S.
trepidella Clemens, Proc. Acad. Nat. Sci., p. 7, 1860; Tin. No. Am., p. 94, 1872; Busck, Proc. Ent. Soc. Wash., V, p. 196, 1903; Dyar, Cat., No. 6394; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52. Pa.
festinella Clemens, Proc. Acad. Nat. Sci., Phil., p. 97, 1860; Tin. No. Am., p. 94, 1872; Busck, Proc. Ent. Soc. Wash., V, p. 196, 1903; Dyar, Cat., No. 6391; Meyr., Gen. Ins., p. 24, 1912; Meyr., Cat., p. 52. Pa.

GRACILARIA Haworth.

Lep. Br., p. 527, 1828.

Type: *Gracilaria syringella* Fabricius.

Coriscium Zeller, Isis, p. 210, 1839.

Type: *Gracilaria cuculipennellum* Hübner.

minimella Ely, Inse. Insc. Mens., III, p. 58, 1915. Conn.

(†) **sebastianella** Busck, Proc. U. S. Nat. Mus., XXIII, p. 251, 1900; Dyar, Cat., No. 6384; Meyr., Gen. Ins., p. 16, 1912; Meyr., Cat., p. 44.

Foodplant: *Sebastiania lucida*. Fla.

(†) **burserella** Busck, Proc. U. S. Nat. Mus., XXIII, p. 251, 1900; Dyar, Cat., No. 6383; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 58.

Foodplant: *Bursera gummiifera*. Fla.

flavimaculella Ely, Inse. Insc. Mens., III, p. 57, 1915. Conn.

cornusella Ely, Inse. Insc. Mens., III, p. 53, 1915.

Foodplants: *Cornus stolonifera* and *C. alternifolia*. Conn., Md.

vacciniella Ely, Inse. Insc. Mens., III, p. 52, 1915.

Foodplant: *Vaccinium*. Pa.

bimaculatella Ely, Inse. Insc. Mens., III, p. 53, 1915.

Foodplant: *Acer rubrum*. Atl. States.

burgessiella Zeller, Ver. zool-bot. Ges. Wien., XXIII, p. 307, 1873;

Dyar, Cat., No. 6378; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58; Ely, Inse. Insc. Mens., III, p. 51, 1915.

Foodplant: *Cornus candidissima*. Mass., Conn.

belfrageella Chambers, Can. Ent., VII, p. 92, 1875; Dyar, Cat., No.

6348; Meyr., Gen. Ins., p. 29, 1912; Braun, Ent. News., XXIII, p. 166, 1912; Meyr., Cat., p. 58.

syn: *auriferella* Frey & Boll, Stett. ent. Zeit., XXXVII, p. 211,

1876; Dyar, Cat., No. 6379; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56. Tex.

Foodplant, *Cornus*. Tex., Atl. States.

blandella Clemens, Proc. Ent. Soc. Phil., III, p. 505, 1864; Tin. No.

Am., p. 257, 1872; Cham., Can. Ent., V, pp. 13, 47, 1873; Dyar, Cat., No. 6349; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 58.

syn: *juglandirorella* Chambers, Can. Ent., V, p. 45, 1873.

Foodplant: *Juglans nigra*. Tex., East States.

juglandiella Chambers, Can. Ent., IV, pp. 28, 88, 1872; V, pp. 45, 47, 1873; Dyar, Cat., No. 6359; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

syn: *juglandisnigraella* Chambers, Bull. Geol. Surv. Terr., IV, p. 149, 1878; Dyar., Cat., No. 6359; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

Foodplants: *Juglans nigra*. East States.

ostryaella Chambers (Braun). Bull. Geol. Surv. Terr., IV, p. 121, 1878; Can. Ent., IX, p. 127, 1877; Braun, Ent. News., XXIII, p. 167, 1912; Ely, Inse. Insc. Mens., III, p. 61, 1915.

Foodplants: *Ostrya*; *Carpinus*. Atl. States.

violacella Clemens, Proc. Ac. Nat. Sci. Phil., p. 7, 1860; Tin. No. Am., p. 93, 1872; Cham., Can. Ent., IV, p. 26, 1872; V, p. 46, 1873; Cin. Quart. Jn. Sci., I, p. 208, 1874; Zeller, Verh. zool-bot. Ges. Wien., XXIII, p. 108, 1873; Dyar, Cat., No. 6352; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58; Busek, Proc. Ent. Soc. Wash., V, p. 196, 1903.

syn: *desmodijoliella* Clemens, Proc. Ent. Soc. Phil., V, p. 145, 1865; Tin. No. Am., p. 268, 1872; Frey & Boll, Stett. ent. Zeit., XXXVII, p. 212, 1876; Dyar, Cat., No. 6352; Busek, Proc. Ent. Soc. Wash., V, p. 196, 1903; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

Foodplant: *Desmodium*. Mo., Atl. States.

(*) **zachrysa** Meyrick, Jn. Bomb. Nat. Hist. Soc., XVII, p. 983, 1907; Gen. Ins., p. 29, pl. fig. 4, 1912; Meyr., Cat., p. 58.

syn: *azalea* Busek, Inse. Insc. Mens., III, p. 42, 1915. N. Y.

Foodplant: *Azalea*. Ceylon.

packardella Chambers, Can. Ent., IV, p. 27, 1872; IX, p. 194, 1877; Cin. Quart. Jn. Sci., I, p. 200, 1874; Dyar, Cat., No. 6372; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

Foodplant: *Acer saccharinum*. Atl. States.

syn: *elegantella* Frey & Boll, Stett. ent. Zeit., XXXIV, p. 202, 1873; Chambers, Cin. Quart. Jn. Sci., II, p. 227, 1875; Dyar, Cat., No. 6372; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

syn: *inornatella* Chambers, Can. Ent., VIII, p. 31, 1876; XI, p. 119, 1879; Dyar, Cat., No. 6372; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

coroniella Clemens, Proc. Ent. Soc. Phil., II, p. 421, 1864; V, p. 145, 1866; Tin. No. Am., p. 243, 1872; Wlsm., Trans. Am. Ent. Soc., X, p. 192, 1882; Dyar, Cat., No. 6351; Busek, Proc. Ent. Soc. Wash., V, p. 216, 1903; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

Foodplant: *Betula populifera*. Pa., Ill., Md., Conn.

glutinella Ely, Inse. Insc. Mens., III, p. 55, 1915.

Foodplant: *Alnus*. Conn., Va.

superbifrontella Clemens, Proc. Ac. Nat. Sci. Phil., p. 5, 1861; Proc.

Ent. Soc. Phil., V, p. 145, 1865; Tin. No. Am., pp. 91, 269, 1872; Frey & Boll, Stett. ent. Zeit., XXXIV, p. 202, 1873; Cham., Cin. Quart. Jn. Sci., I, p. 200, 1874; II, p. 226, 1875; Dyar, Cat., No. 6372; Busek, Proc. Ent. Soc. Wash., V, p. 194, 1903; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 58.

Foodplant: *Hamanecis virginiana*. Atl. States.
negundella Chambers, Can. Ent., VIII, p. 18, 1876; Bull. Geol. Surv. Terr., III, p. 132, 1877; Psyche, III, p. 66, 1880; Dyar, Cat., No. 6360; Meyr., Gen. Ins., p. 28, 1912; Braun, Ent. News., XXIII, p. 169, 1912; Meyr., Cat., p. 56.

Foodplant: *Negundo aceroides*. Col., Atl. States.
stigmatica Fabricius, Sp. Ins., II, p. 295, 1781; Chambers, Can. Ent., XI, pp. 74, 119, 1879; XII, p. 24, 1880; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Dyar, Cat., No. 6362; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 59.

Foodplants: *Salix* and *Populus*. Europe, Transcaspian, U. S.
 syn: *purpurella* Chambers, Can. Ent., IV, p. 27, 1872; V, p. 46, 1873; IX, pp. 126, 194, 1877; XI, p. 74, 1879; Dyar, Cat., No. 6362; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 59.
 (*) syn: *consimilella* Frey & Boll, Stett. ent. Zeit., XXXVII, p. 210, 1876; Dyar, Cat., No. 6380; Meyr., Gen. Ins., p. 29, 1912; Meyr., Cat., p. 59.
 (*) **populiella** Chambers, Cin. Quart. Jn. Sci., II, p. 301, 1875; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6373; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

Foodplant: *Populus*. Col.
 (*) **palustriella** Braun, Ent. News., XXI, p. 178, 1910; Meyr., Cat., p. 56.

Foodplant: *Salix*. Calif.
rhoifoliella Chambers, Can. Ent., VIII, p. 31, 1876; Dyar, Cat., No. 6363; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

Foodplant: *Rhus*. Kan., East. States, So. States.
sassafrasella Chambers, Can. Ent., VIII, p. 33, 1876; Dyar, Cat., No. 6367; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

Foodplant: *Sassafras*. Atl. States.
 (*) **obscuripennella** Frey & Boll, Stett. ent. Zeit., XXXVII, p. 209, 1876; Dyar, Cat., No. 6382; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 58.

acerifoliella Chambers, Cin. Quart. Jn. Sci., II, p. 299, 1875; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6342; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

Foodplant: *Acer*. Col.
atmosella Zeller, Verh. zool-bot. Ges. Wien., XXIII, p. 309, 1873; Dyar, Cat., No. 6346; Meyr., Gen. Ins., p. 27, 1912; Meyr., Cat., p. 55.

Tex., Atl. States.

quercinigrella Ely, Inse. Inse. Mens., III, p. 60, 1915.
 Foodplant: *Quercus*. Conn.

(*) **reticulata** Braun, Ent. News., XXI, p. 177, 1910.
 Foodplant: *Quercus agrolia*. Calif.

flavella Ely, Inse. Inse. Mens., III, p. 56, 1915.
 Foodplant: *Myrica cerifera*. Conn.

alnivorella Chambers, Cin. Quart. Jn. Sci., II, p. 299, 1875; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6344; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.
 Foodplant: *Alnus*. Can. West. States.

syn: *alnicolella* Chambers, Cin. Quart. Jn. Sci., II, p. 299, 1875; Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6343; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *pulchella* Chambers, Can. Ent., VII, p. 186, 1875; Dyar, Cat., No. 6377; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *sanguinella* Beutenmüller, Ent. Am., IV, p. 30, 1888; Dyar, Cat., No. 6368; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *nigristrigella* Beutenmüller, Ent. Am., IV, p. 30, 1888; Dyar, Cat., No. 6361; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *ruptostrigella* Beutenmüller, Ent. Am., IV, p. 30, 1888; Dyar, Cat., No. 6361; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *shastaella* Beutenmüller, Ent. Am., IV, p. 30, 1888; Dyar, Cat., No. 6369; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

syn: *juscoochrella* Beutenmüller, Ent. Am., V, p. 10, 1889; Dyar, Cat., No. 6358; Busek, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 57.

(*) **strictella** Walker, Cat. Brit. Mus., XXIX, p. 591, 1864; Dyar, Cat., No. 6386; Meyr., Gen. Ins., p. 27, 1912; Meyr., Cat., p. 56.

syn: *adaptella* Walker, Cat. Brit. Mus., XXIX, p. 590, 1864; Dyar, Cat., No. 5778; Meyr., Gen. Ins., p. 27, 1912; Meyr., Cat., p. 56.

(*) **sauzalitoella** Chambers, Can. Ent., VIII, p. 32, 1876; Dyar, Cat., No. 6366; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56. Calif.

syn: *sauzalitella* Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 56.

murtfeldtella Busck, Proc. U. S. Nat. Mus., XXVII, p. 771, 1904; Meyr., Gen. Ins., p. 28, 1912; Meyr., Cat., p. 58. D. C. Mo., Wash.

serotinella Ely, Ent. News., XXI, p. 57, 1910; Meyr., Cat., p. 49.
 Foodplant: *Prunus serotina*. N. Atl. States.

paradoxum Frey & Boll, Stett. ent. Zeit., XXXIV, p. 205, 1873; XXXVII, p. 212, 1876; Cham., Cin. Quart. Jn. Sci., I, p. 200, 1874; Dyar, Cat., No. 6397.

Atl. States.

syn: *paradoxa* Meyr., Gen. Ins., p. 21, 1912; Meyr., Cat., p. 49.

cuculipennellum Hübner, Ges. eur. Schmett., VIII, Tin., VI, Al. B. F. 2, 1831; Fernald, Can. Ent., XXV, 96, 1893; Dyar, Cat., No. 6401; Kellogg, Am. Insects, p. 378, 1905; Braun, Can. Ent., XLIV, p. 160, 1912.

Foodplant: *Ligustrum.*

Europe.

syn: *cuculipennella* Meyr., Gen. Ins., p. 26, 1912; Meyr., Cat., p. 55.

?syn: *fraxinella* Ely, Insc. Insc. Mens., p. 58, 1915.

Foodplant: *Fraxinus.*

N. Y., Ohio, Conn.

Not recognized from descriptions.

(*) **aceriella** Chambers, Jn. Cin. Soc. Nat. Hist., III, p. 295, 1880; Dyar, Cat. No. 6341; Meyr., Gen. Ins., p. 27, 1912; Meyr., Cat., p. 56.

Foodplant: *Acer.*

Mass.

(*) **behrensella** Chambers, Can. Ent., VIII, p. 32, 1876; Dyar, Cat., No. 6347; Meyr., Gen. Ins., p. 27, 1912; Meyr., Cat., p. 55.

Cal.

(*) **ribesella** Chambers, Bull. Geol. Surv. Terr., III, p. 132, 1877; Dyar, Cat., No. 6376; Larva only described.

Foodplant: *Ribes.*

Col.

SCHISTOCERCA TARTARICA TAKEN AT SEA.

BY L. O. HOWARD

A specimen of *Schistocerca tartarica* (determined by Caudell) was received from Professor Marvin, the Chief of the Weather Bureau, to whom it had been sent by Captain B. Morthensen of the Norwegian bark *Robert Scrافت*. It seems that Captain Morthensen is one of the coöperative marine observers of the Weather Bureau, and he noted in his report that on October 7, 1916, a lot of these grasshoppers came aboard in lively condition. At that time the vessel was 1200 nautical miles from the African coast, latitude $20^{\circ} 57' N.$, longitude $39^{\circ} 28' W.$ The author has been informed by Mr. Caudell that this locust occurs in southern Europe, Africa, in Ceylon, and also in Central America and northern South America, and that there are records of its prolonged flight over the sea. It is worth while, however, to place this well authenticated case on record.

COLOR VARIATION IN PUPAE OF *TERIAS NICIPPE* CRAMER.

BY GEO. G. AINSLIE,

United States Entomological Laboratory, Knoxville, Tenn.

In a note in the first volume of Entomological News, page 129, Dr. H. Skinner mentions the variation in the color of the pupae of *Terias nicippe* Cramer and states that he found both green and black pupae. Scudder, in his "Butterflies of the Eastern United States," makes a similar observation, some of his specimens being mottled. All those reared disclosed normal adults.

A further observation was made by the writer at Hartsville, Tennessee, in August, 1913. Larvae of this species were found feeding on plants of *Cassia tora* and *C. marylandica*. Supposing them to be those of *Eurymus erythème* which they closely resemble, a number were collected and placed in cages on alfalfa, clover and various other plants. The immature larvae died without feeding, the rest pupated suspended in their normal position on the various plants with which they were confined. The pupae thus obtained and an additional series taken in the field at the time of the original collection present an interesting range in coloration. Pupae formed on the leafy parts of the normal food plants are green. In this series those formed on the caged plants of alfalfa, clover, etc., were also green but of a shade agreeing exactly with that of the particular plant on which they were found. One pupa found in the field suspended close to and partly from one of the yellow flowers of *Cassia tora* was of a uniform yellow color, matching the flower. From some plants growing close to an old rusty wire fence some larvae had migrated to the fence and had pupated suspended from the wires. These pupae varied from Brown to black in color, in each case agreeing closely with the color of the wire from which it hung. All the pupae developed into normally colored butterflies.

THREE HUNDRED AND FIRST MEETING,

FEBRUARY 8, 1917.

The 301st regular meeting of the Society was entertained by Mr. C. L. Marlatt at the Saengerbund Hall, February 8, 1917. There were present Messrs. Back, Baker, Barber, Borden, Böving, Busek, Cole, Cary, Craighead, Crawford, Cushman, Dietz, Ely, Fink, Fisher, Garman, Gill, Greene, Heinrich, Hyslop, Isely,

Jennings, Kotinsky, Middleton, Miller, Paine, Pierce, Rohwer, Sanford, Sascer, Schwarz, Snyder, Speare, Webb, White, members, and A. J. Flebert, R. M. Foutz, W. V. King, Albert Lepper, H. F. Loomis, H. S. McConnell, C. J. Pierson, and Delmar Webb, visitors.

At the end of the regular program, the meeting was brought to a delightful close by the presentation to the Saengerbund by the Entomological Society of a nearly life-sized portrait of Mr. E. A. Schwarz, honorary president of our Society and for many years a member of the Saengerbund. President Ely made the presentation address in which he spoke feelingly of Mr. Schwarz's long connection with the Society and the high place he holds in the esteem of his fellow-members. At the close of his remarks the president read a letter from Dr. L. O. Howard setting forth his disappointment at not being able to be present to take part in the presentation and expressing in fitting terms his admiration and affection for Mr. Schwarz.

The gift was accepted, on behalf of the Saengerbund, by its president, Mr. Albert Lepper, who expressed the gratification and appreciation of his Society and in a few appropriate remarks told of the esteem in which Mr. Schwarz is held by his associates in the Saengerbund.

Mr. Schwarz expressed his appreciation of this demonstration of affection and regard on the part of his fellow society-members and with characteristic modesty stated: "It is more than I deserve. Whatever benefit I may have been to the Society or whatever help I may have been, is sufficient reward in itself."

The following program was presented:

TWO NEW CHALCIDS FROM THE SEEDS OF AMELANCHIER.¹

By R. A. CUSHMAN,

Entomological Assistant, Bureau of Entomology.

No chalcid has heretofore been recorded as breeding in the seeds of any species of the genus *Amelanchier*. Discovery that there is such an insect developing in the seeds of the shad bush (*A. cana-*

¹ Published by permission of the Secretary of Agriculture.

densis) was first made by the writer on July 1, 1914, when a small package of the berries was received at North East, Pa., from Mr. Fred E. Brooks of the Bureau of Entomology, stationed at French Creek, W. Va. A few of the seeds were found to contain full-grown chalcid larvae. Closer examination of these larvae a few days later disclosed the fact that they were apparently of two species, the mandibles in one form being dentate and in the other edentate.

On July 18, of the same year, larvae were found in the seeds of berries collected by the writer near North East, Pa.

Parts of both of these lots of material were placed in breeding jars and kept until the spring of 1915, but nothing was reared.

No further information concerning the chalcids was obtained until June 21, 1915, when one female of each of two species of *Syntomaspis* were beaten from a shad bush bearing nearly ripe fruit at North East. These were placed in cages on the tree, and one was later observed to attempt oviposition in a nearly ripe berry. No activity of this sort was observed for the other species.

In the summer of 1915 more berries were collected at North East and more received from Mr. Brooks from both French Creek and Pickens, W. Va. All of these lots were found by examination to contain some infested seeds. The bulk of each lot was placed in a jar for rearing.

On May 26, 1916, all the seeds in the French Creek lot were examined. Nearly all of the living insects found were in the pupal stage, most of them nearly ready for transformation, but a few were still in the larval stage. All of the latter had the mandibles acute and toothless. All of these stages were removed from the seeds, placed in a watch glass, and covered. On May 28, three female specimens of a species of *Megastigmus* were reared. On the same date three females and one male of the same species emerged from the berries from Pickens, W. Va. On June 1, emergence ceased and the contents of the Pickens and North East cages were examined. This resulted in the finding of many dead adults, all *Megastigmus*. Up to this time there has been recorded from the Pickens lot 17 females and 3 males. The dead in this lot totaled 28 females and 1 male. Although the first specimens seen were found on May 28, the finding of so many dead specimens so soon after that date would seem to indicate that emergence probably began some time earlier. The balance of the immature stages from the French Creek lot, both larvae and pupae, were put in alcohol. There was no further rearing from the North East berries, but on June 10 emergence from the Pickens lot began again. This time,

however, the insects reared were a *Syntomaspis* of the same species as the one observed to attempt oviposition in the previous season. Before this time, on May 31, one male of the species had appeared in the Pickens material. Emergence of *Syntomaspis* continued until June 16.

The result of the rearings led to the suspicion that the *Syntomaspis* was parasitic on the *Megastigmus*, and support of this idea was secured when examination of a seed from which a *Syntomaspis* had emerged disclosed an exuvium of a full-grown larva with edentate mandibles and a dead and shrivelled larva with dentate mandibles. Whether this is the normal habit of *Syntomaspis* can not be stated definitely, but the much later emergence of the *Syntomaspis*, together with its comparative rarity and the condition of the seeds of the berries at the time the adults are active all indicate that such is the case.

The finding of the traces of both species in the single seed also fixed the relation between the two species of adults, the larva with dentate mandibles being that of *Megastigmus* and the one with edentate mandibles that of *Syntomaspis*. Further proof of the identity of the larvae was obtained on July 9, when berries exposed to the attack of *Megastigmus* in cages and protected against subsequent attack were found to contain larvae with dentate mandibles.

The two species of insects concerned, both new to science, are described herewith.

Megastigmus amelanchieris n. sp.

In Crosby's table to North American species of the genus¹ runs to *brevicaudis* Ratzeburg, the ovipositor being barely as long as the abdomen and the stigmal club broadly oval (Plate I, fig. f). It is easily distinguishable from that species by the color of the pronotum, which is black above and yellow at the sides, and that portion of the scutellum beyond the groove being smooth and polished, while in *brevicaudis* it is finely aciculate.

Female.—Length 2.6 mm., abdomen 1 mm., ovipositor 1 mm. Head viewed from in front slightly wider than long, viewed from above with the temples as broad as the eyes and nearly angulately rounded; eyes slightly divergent below; clypeus very short and broadly emarginate at apex; malar space about as long as basal width of mandibles; sides of face obliquely striate with a few large, setigerous punctures above the antennal fossae; vertex, frons, and superior orbits transversely striate, with a few large, shallow pits on orbits and vertex; anterior ocellus somewhat larger than lateral ocelli; ocell-ocular and interocellar lines equal

¹ Crosby, C. P., Ann. Ent. Soc. Am., Vol. VI, 1913, p. 156.

and slightly more than half as long as postocellar line; pronotum transversely rugose above, obliquely striate and with scattered pits laterally; mesonotum transversely, arecately striate, the striae strongest on mesoscutum and weakest on the scutellum, the latter being smooth beyond the erenulate transverse furrow; mesopleurum coarsely, granularly opaque above the suture, vertically striate below; propodeum coarsely roughened, with some oblique rugosity basally; stigmal club broadly oval; basal vein weak but distinctly indicated; abdomen about as high as long, polished; ovipositor as long as abdomen, strongly upcurved.

Black, with face, mouth, orbits except a broad interruption at top of eyes, in which is a brownish spot, scape and pedicel below, sides of pronotum, legs, except hind coxae and base of middle coxae, and tegulae lemon yellow; sides of abdomen more or less brown stained.

Male.—Length 2.3 mm., abdomen 1 mm. Very like female, with sculpture throughout weaker, abdomen very strongly compressed, first tergite in side view much longer than high; stigmal club considerably broader; antennae yellow below throughout.

Host.—Seeds of *Amelanchier canadensis*.

Type locality.—Pickens, W. Va.

Other localities.—French Creek, W. Va., and North East, Pa.

Type.—Cat. No. 20964 U. S. N. M.

Described from a considerable series of specimens, including two males, from the three localities, those from Pickens, W. Va., under Quaintance No. 10930, those from French Creek, W. Va., under Quaintance No. 10929, and those from North East, Pa., under Quaintance No. 11014. The two lots of breeding material from West Virginia were collected by Mr. Fred E. Brooks of the Bureau of Entomology, but all specimens were reared by the author at North East, Pa.

The principal variations are in size, 2-2.6 mm. in the female, and in the extent of the orbital maculation, some of the specimens having the yellow color much less extensive above and with a nearly complete interruption in the cheek. Some of the specimens, especially the smaller ones, have the sculpture less strong throughout.

Syntomaspis amelanchieris n. sp.

Female.—Length 2.6 mm., abdomen 1.2 mm., ovipositor 1.5 mm. Head in front view round, slightly wider than long, viewed from above strongly transverse, the temple sharply, roundly sloping, head shagreened, the sculpture finer and fainter on face; width of face equal to height of eyes, the latter parallel within; elyptus polished at apex and with a median tooth; malar space subequal to basal width of mandible; interocellar line half as long as postocellar and slightly shorter than ocelloocular; middle antennal joints wider than long. Thorax above shagreened with scat-

tered punctures, pronotum transversely striate; thorax laterally shagreened, mesopleurum above pleural suture polished; propodeum shagreened, subpolished medially; coxae obscurely shagreened; abdomen polished, faintly reticulate laterally; ovipositor slightly longer than abdomen.

Metallic green with bronzy reflections, this color extending to the coxae and femora; hind tibiae dark brown, legs otherwise yellow; scape yellow, antennae otherwise blackish with purplish bronze luster.

Male.—Length 2.3 mm. In sculpture and color very similar to female.

Type locality.—Pickens, W. Va.

Other locality.—North East, Pa.

Type.—Cat. No. 20968 U. S. N. M.

Described from five females and one male reared by the author May 31 to June 16, 1916, under Quaintance No. 11013, from seeds of *Amelanchier canadensis* in company with *Megastigmus amelanchieris* Cush. The material collected at the type locality by Mr. Fred E. Brooks, and one female captured by the author on the same plant at North East, Pa., June 21, 1915, and later observed to attempt oviposition in an *Amelanchier* berry.

The specimens show very little variation in size or sculpture. Paratypes *d* and *e* have distinct purplish reflections at the base of the abdomen.

HABITS OF MEGASTIGMUS.

At the time when emergence of *Megastigmus* was in progress the *Amelanchier* berries were from three-sixteenths to one-fourth inch in diameter, and the seed contents semifluid to gelatinous.

Oviposition takes place in late May and early June at the latitude of North East. In oviposition the female inserts her ovipositor through the side of the berry. The egg has not been found, but, as is the case in all seed-chalcids, the eggs of which are known, it is undoubtedly deposited within the tissue of the seed. The larva consumes the entire seed contents and attains full growth by shortly after the first of July. By this time the fruit is ripening and falling to the ground, and the seed coat has become hardened and brown. Infested seeds are less plump and more irregular in form than sound seeds and will float on water, while sound seeds will sink. Within the seed the larva contracts and becomes less strongly curved and remains in this condition until the following spring, when it pupates and a few days later emerges as the adult insect. Thus in the development of a single generation very nearly the entire year is consumed.

Thus far the only known host of this species is *Amelanchier canadensis* and the only localities French Creek and Pickens, W. Va., and North East, Pa. Through the kindness of Mr. Lewis

H. Weld of the faculty of Evanston Academy, Evanston, Ill., a large lot of berries of the 1916 crop were received from Evanston, but these were apparently uninfested. A large lot of the berries of the purple fruited *Amelanchier oligocarpa* were also received from Mr. Brooks, who had collected them in the mountains of Tucker Co., W. Va. No infestation was found in this lot.

HABITS OF SYNTOMASPIS.

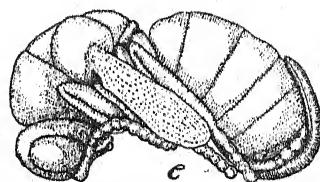
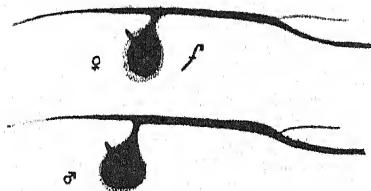
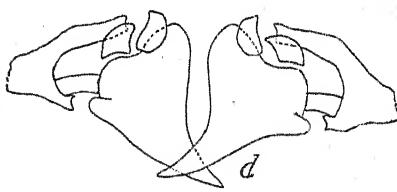
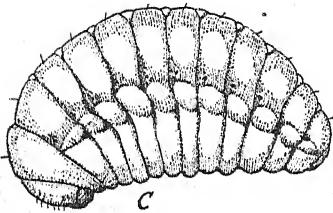
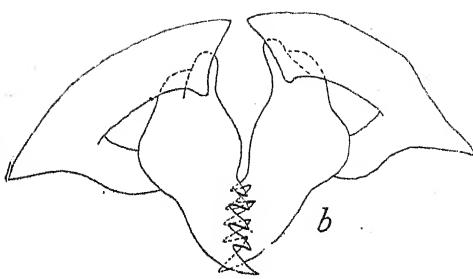
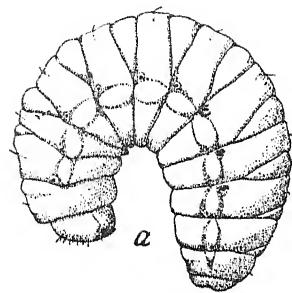
The adults of *Syntomaspis* emerge in the spring from two to three weeks later than *Megastigmus*. At this time the berries are nearly full grown, and the seeds are beginning to harden. Oviposition takes place during the latter part of June, and the insect passes the winter as a somewhat contracted larva within the seed.

LARVAE OF MEGASTIGMUS AND SYNTOMASPIS.

The larvae of the two species (Plate X, fig. *a* *Megastigmus* and fig. *c* *Syntomaspis*) are superficially very similar. Both are stout, white, footless grubs about 2.5 to 3 mm. long, tapering toward each end and curved toward the venter, that of *Megastigmus* being much the more strongly so. Both have spiracles on the anterior edges of the mesothoracic and metathoracic and first seven abdominal segments. The most striking difference between the larvae is found in the mandibles. As stated above those of *Syntomaspis* are edentate while those of *Megastigmus* have a series of strong teeth on the inner margin. The normal number of teeth is four, but occasionally one mandible in a pair has but three teeth, sometimes regularly spaced and sometimes as though there were four with the second tooth missing. The mandibles articulate with chitinous structures on the inner surface of the integument. In *Megastigmus* these are broad and strongly angulate at the outer superior and inferior angles. In *Syntomaspis* they are narrow and nearly semicircular without strong angulations. In making slide mounts of these structures it is difficult to maintain the normal position and relations, and the accompanying figures (Plate I, figs. *b* and *d*) drawn from slide mounts do not show them as they actually appear from a surface view of the face of the larva.

PUPA OF MEGASTIGMUS.

The pupa of the *Syntomaspis* has never been seen. That of the female of *Megastigmus* (Plate X, fig. *e*) is short with the head bent downwards and with the legs, antennae, and wing pads folded along the sides and venter in the manner usual with hymenopterous pupae. The ovipositor is curved upward close to the back



and reaches nearly half way over the back of the abdomen. The male pupa is more slender and the abdomen is much narrower.

PLATE X.

Megastigmus amelanchieris CUSH.

- a.*—Full-grown feeding larva.
- b.*—Mandibles and supporting ridges of same.
- c.*—Pupa.
- f.*—Stigmal clubs.

Syntomaspis amelanchieris CUSH.

- c.*—Hibernating larva.
- d.*—Mandibles and supporting ridges of same.

PHOTOMICROGRAPHY AND ITS APPLICATION TO THE STUDY
OF THE COCCIDAE.

BY E. R. SASSER.¹

In the discussion of this paper Mr. Schwarz inquired as to the best method of mounting coccidae for photomicrographing. Mr. Schwarz stated that glycerin mounts gave the best results, but that since most of the material that he had to examine is mounted in balsam he preferred that all be thus mounted. Mr. Baker suggested that for purposes of reproduction the photomicrographs should be retouched in order to bring out the important characters. To this Mr. Sasseer objected on the ground that this might lead to the overlooking by others of the characters thus intensified through their expecting to find them as conspicuous in the specimen as in the published figure. The paper was further briefly discussed by Messrs. Kotinsky, Ely, and Paine.

NOTES ON TWO SPECIES OF ACROBASIS, ESPECIALLY
INJURIOUS TO PECANS.

BY J. B. GILL.¹

¹ Withdrawn from publication.

ORYSSUS IS PARASITIC.

BY H. E. BURKE,

*Specialist in Forest Entomology.*¹

So far as can be determined, the larval habits of the family Oryssidae have never been published. Harrington (Trans. Roy. Soc., Canada, Sect. IV, p. 151, 1893) says that "It has been suggested that they are of a parasitic habit, and the actions of the insects when searching for a place to oviposit very much resemble those of species well known to be parasitic." Rohwer (Proc. U. S. Nat. Mus., Vol. 43, p. 156, 1912) refers to an observation by Dr. A. D. Hopkins which indicates parasitism. He collected a pupa in an old mine of a Cerambycid in the dead wood of a living Douglas spruce (*Pseudotsuga taxifolia*) at Port Angeles, Washington, on May 15, 1899. A male was reared from this and named *Oryssus hopkinsi* Rohwer.

During the past two years a number of observations have been made by the various men attached to the Pacific Slope Forest Insect Station which definitely prove that *Oryssus* is parasitic on several species of the genus *Buprestis* and probably also on other *Buprestidae*.

The first of these observations was made by the writer at Placerville, Calif., on March 21, 1914. A parasitic larva was found in a cell in the outer wood of an old scar on one side of the trunk of a healthy Douglas spruce near a young adult and a large larva of *Buprestis aurulenta* Linn. The parasitic larva was then supposed to be an *Ichneumonid* parasite of the *Buprestis*.

On September 17, 1915, Entomological Ranger J. D. Riggs collected at Bray, Calif., two larvae in an old aspen (*Populus tremuloides*) log. One was in the pupal cell with the fragments of a beetle (*Buprestis confluenta* Say) and the other was attacking a larva of this same *Buprestis*. This latter specimen of parasitic larva pupated on March 9, 1916, and transformed to a female adult *Oryssus occidentalis* Cresson on March 29, 1916.

While collecting in some old weather beaten yellow pine (*Pinus ponderosa*) logs near Placerville, Calif., on November 2, 1915, Entomological Ranger F. B. Herbert and the writer found a number of naked larvae, which we took to be *Ichneumonid* larvae, in the pupal cells of *Buprestis laeviventris* with the remains of the larvae of that species. On March 17, 1916, three of these pupated. One of these transformed to an adult *Oryssus occidentalis* on April 6, one on April 8, and one was preserved as a specimen.

¹ Branch of Forest Insects, Bureau of Entomology, U. S. Department of Agriculture.

One larva pupated on March 18 and transformed to an adult April 8, and another pupated on March 22, and transformed on April 15.

On April 4, 1916, another examination of these logs was made. Mr. Herbert found an *Oryssus* pupa in what appeared to be the pupal cell of the Buprestid *Chrysophana placida*. At the same time the writer found a large *Oryssus* pupa in the pupal cell of *Buprestis laeviventris*. This transformed to a large female on April 19.

At the last examination of the logs on May 27, Mr. Herbert "noticed an *Oryssus* female crawling over the same log from which we had obtained specimens of *Oryssus Buprestis laeviventris*, *Buprestis aurulenta*, *Chrysophana placida*, and *Leptura laetifica*. She was examining the log very carefully, sweeping her antennae across the surface of the wood at every step. She systematically covered most of the log, going the length of it three different times and covering certain areas 6 or 8 different times. After thirty-five minutes she apparently found a spot to her liking, which she covered several times. She finally placed her body at an angle of 15 to 20 degrees with the surface of the wood, with the abdomen against the wood, and began boring with the ovipositor. After $4\frac{1}{2}$ minutes she pulled the ovipositor out and began examining the log again when she was captured. During the boring her body and antennae quivered all the while." The spot on the log where she had bored was marked and examined. The hole made by the ovipositor was followed for $\frac{3}{4}$ of an inch until lost in the boring dust of a *Buprestis* larval mine.

Besides the records which point to the parasitic nature of *Oryssus occidentalis* the following records have been made: by the writer—June 23 to July 7, 1906, four males and four females, at Summerville, Calif., crawling on a weather beaten white fir (*Abies concolor*) log at an old mill; May 31, 1912, a female near Yreka, Calif., crawling over the trunk of a yellow pine (*Pinus ponderosa*) peeled during March, 1912, in the control work against the western pine beetle (*Dendroctonus brevicomis*); July 17, 1915, an adult male and female at Fallen Leaf, Calif., crawling up and down an old dead white fir (*Abies concolor*) stub; August 4, 1915, near Vade, Calif., a female crawling on the trunk of a solid, weather beaten, dead lodgepole pine (*Pinus contorta*), which was infested with *Buprestis aurulenta* larvae. By Entomological Ranger J. J. Sullivan—February 4, 1914, at Placerville, Calif., a larva from the outer wood of a dead digger pine (*Pinus sabiniana*) stump, which pupated on March 1 and transformed to an adult female on March 20; April 3, 1915, at Placerville, a pupa from the outer wood of a rotten sugar pine (*Pinus lambertiana*) stump which was a live female in the rearing vial on

June 8. By Entomological Ranger F. B. Herbert—July 7, 1915, a female flying in the forest at the Pyramid Ranger Station, Calif.; July 17, 1915, at Fallen Leaf, Calif., a female crawling on a dead white fir (*Abies concolor*); and May 5, 1916, at Placerville, Calif., a female on the stump of a yellow pine (*Pinus ponderosa*) treated in February, 1915, in the control work against the western pine beetle (*Dendroctonus brevicomis*).

Probably the most interesting point connected with the life history of *Oryssus* is what becomes of the long external ovipositor of the pupa upon transformation to the adult. The actual transformation was not observed so this is a point to be determined by future study. Another point to be determined is the exact length of the life cycle. The larvae of the genus *Buprestis* upon which the *Oryssus* is parasitic live for several years in the wood of the host plant. So far the *Oryssus* larvae have been found only with the large larvae of the *Buprestis*. Whether they are internal feeders when small in the small larvae of the *Buprestis* or whether they attack only the large larvae are points for future determination.

The specimens upon which these observations were made will be turned over to Mr. S. A. Rohwer for taxonomic study. As the larvae appear quite different from the typical horntail (*Siricoidea*) larva and the habits are quite different, the systematic position of *Oryssus* in the classification of the Hymenoptera may be changed.

IDIOGASTRA, A NEW SUBORDER OF HYMENOPTERA WITH NOTES ON THE IMMATURE STAGES OF ORYSSUS.

By S. A. ROHWER, *Specialist in Forest Hymenoptera*, AND R. A. CUSHMAN,
Entomological Assistant,

Bureau of Entomology, Washington, D. C.

The summary by Rohwer of the literature dealing with the habits of the oryssoids published in 1912 (Proc. U. S. Nat. Mus., vol. 43, p. 141), shows the conflicting suppositions explaining the habits of the members of this interesting group. The importance of the discovery of the larva of *Oryssus occidentalis* and its habits by Mr. H. E. Burke are very manifest and have called forth the remarks on the position of the group offered below.

While the authors do not believe that the biology or any characters especially developed by unusual habits should be made the primary reason for systematic groups we do believe that biology offers a good index to affinities and gives valuable suggestions as to

the use of stable body characters. It is also possible that unusual habits may be the cause for the development of unusual characters which may be very valuable taxonomically, but may not necessarily express the true relationships.

In raising the oryssoids to subordinal rank we have only expressed in a taxonomic way the unusual, valuable, and striking differences which exist between them and the Chalastogastra and we believe that the parasitic habit of the larva indicates that these characters are of subordinal value.

As early as 1829 Macleay suggested that the sawflies could constitute a separate order and proposed the name *Bomboptera* and now in 1916 Crampton (Ent. News, vol. 27, p. 303) without definitely limiting or giving any defining characters and for apparently no other than theoretical reasons says: "The Hymenopterous insects should be divided into two orders, the *Prohymenoptera* or Tenthredin group, and the *Hymenoptera* proper." We can see no real advantage in dividing the order *Hymenoptera*, as usually defined, into two orders and we believe that the group, as usually treated, is a homogeneous unit for which ordinal division is unnecessary and undesirable. The subordinal group *Idiogastra* is in itself sufficient reason to discard the ordinal names *Bomboptera* and *Prohymenoptera*.

LARVA OF *Oryssus occidentalis*.

(Description drawn from alcoholic specimens.)

The larva is white, subcylindrical, about one-third as thick as long, tapering slightly at each end, and somewhat flattened dorso-ventrally. The caudal extremity is slightly upcurved. The constriction between the head and thorax is rather weak. The head is very short antero-posteriorly and less than half as broad as the greatest diameter of the body. The antennae are tubercle-like and set at the summits of rounded elevations. The mouth-parts are very simple, the labrum, labium, and maxillae being merely fleshy lobes, the last not divided into the usual parts. On each side of the middle of the labrum and near the apex is an irregular group of minute sensory papillae. The labial and maxillary palpi are apparently not at all developed, but on the surface of the labium are a few short, stout setae and on the maxillae in a brownish area a few sensory papillae. The mandibles are heavily chitinized, curved, narrow, and tridentate at apex, the outside teeth equal and shorter than the median, broad at base and articulating internally with heavily chitinized points at the dorsal and ventral angles. The ventral articulation extends, weakly chitinized, along the suture between the epieranium and the soft ventral surface of the head. There is also a weakly chitinized ridge internally along the lower edge of the maxilla. On plate XII, figure 1, these chitinized ridges and the concealed portions of the mandibles are indicated by stippling.

Each thoracic and abdominal segment has dorsally at each side of the middle a low, transverse elevation surmounted by a transverse row of four or five short, stout, backward pointing spines. The mesothoracic, metathoracic, and first eight abdominal segments bear spiracles. Those of the mesothorax are situated in the intersegmental skin between the prothorax and mesothorax, apparently on the prothorax. Those of the metathorax are rudimentary and nonfunctional, and are, like those of the abdominal segments, situated near the anterior margin of the segment. The larva is legless, but the positions of the legs are indicated by chitinized disks.

PUPA OF *Oryssus occidentalis*.

(Descriptions drawn from alcoholic specimens.)

Female.—Uncolored. In general the head, thorax and base of abdomen resemble the adult but the most striking difference occurs in the ovipositor and sheath which is curved up over the back and reaches the anterior margin of the head. Head much as in adult, even to the definition of the tubercles around the ocelli; the pupal skin enclosing the antennae obscures the joints but from what can be seen the ninth is not abnormally swollen and is connected with the tenth by its entire apical width; tarsi jointed as in adult; thorax much the same as to the sutures (these not well defined in adult); the straight suture separating the scutum and scutellum, which is strong in the adult, is weak in the pupa and the suture dividing the scutellum, which is weak in the adult, is strong in the pupa. Abdomen with seven well defined, visible tergites, the first not divided; the eighth tergite smaller than the seventh; ninth tergite represented dorsally as a narrow plate but produced anteriorly and ventrally; tenth tergite not clearly defined but probably represented at the apical end of the ninth as a transverse plate; second to eighth tergites, inclusive, with a series of fleshy protuberances surmounted by transverse rows of spines near apical lateral margin. First sternite concealed, the six following well defined, the second nearly covered by hind coxae, the remaining uncovered and visible; eighth and ninth sternites not visible except as represented by their appendages; tenth sternite not visible externally; pleural fold fleshy. The external portion of the ovipositor as described above; internally it extends forward into the mesothorax where it makes a simple loop.

The following are the most striking differences between the female pupa and adult.

1. Ninth antennal joint normal.
2. Scutum without lateral sutures.
3. Accessory suture of scutellum strong.
4. Suture between scutum and scutellum weak.
5. Tergites with fleshy protuberances.
6. Apical tergites and sternites different.
7. Ovipositor curled up over the back.

Male.—A pupal envelop which contains a nearly fully colored adult does not show, without dissection anything especially extraordinary. The pupal envelop shows the thoracic structure of the female pupa, spines on apical margins of tergites two to eight inclusive; and sternites two to six inclusive.

SUBORDER IDIOGASTRA, NEW SUBORDER.

This suborder is proposed for the superfamily Oryssoidea as defined by Rohwer in 1911 (Proc. Ent. Soc. Wash., vol. 12, no. 4, p. 217) and 1912 (Proc. U. S. Nat. Mus., vol. 43, p. 146).

As a systematic division the suborder Idiogastra has long been recognized but it is only comparatively recently (MacGillivray, 1906, Enslin, 1911, Rohwer, 1911, 1912) that it has been considered as an unusually well defined group. From the standpoint of the adult this suborder is more closely allied to the Sirecoid part of the Chalastogastra but it may be easily separated from all the Chalastogastra by the marked reduction of wing veins which resembles, except for the presence of a complete anal cell, some braconids;¹ the curious position for the insertion of the antennae, in which it resembles the Stephanidae; in the loss of the metapostnotum in which it resembles the Clistogastra; in the remarkable invaginated ovipositor, in which it is not approached by any other Hymenopteran; in the longitudinally divided ninth and tenth tergites an analogy of which may be found in some of the Clistogastra; and in the male genitalia which more closely resemble those of the Clistogastra. From the standpoint of the larva the Idiogastra are much more closely allied to the Clistogastra and it is only with hesitancy that we offer the characters in the following key, for it is certain that the larvae of the Clistogastra are very imperfectly known and it is possible that it will ultimately be found very difficult to separate the suborders Idiogastra and Clistogastra on larval characters. Briefly expressed the suborder Idiogastra stands intermediate between the suborder Chalastogastra—where the adult would place it—and the suborder Clistogastra—with which the larva would ally it.

Adult characters.—The face is prolonged below into a prominent flange, below which the antennae are inserted, and which extends laterally and posteriorly forming a scrope for the reception of the basal part of the antenna; the antennae are inserted below the lower eye margin; the clypeus is fused with the face

¹ In some braconids (*Helconidea*, etc.) two interanal veins are present which if connected by the last apical abscissa of anal would make a wing not greatly unlike *Oryssus*.

and concealed below the facial flange; the labrum is small, free, present between bases of mandibles; the vertex is tuberculate; the antennae of the female are 10-jointed, with the ninth joint large and the apical one small, in the male they are slender, normal and 11-jointed; the pronotum is narrow, the posterior margin arcuate; the mesoscutellum is truncate anteriorly and separated from the mesoscutum by its entire width; the metapostnotum is wanting; the wings have two cubital cells, one recurrent vein and one or two closed anal cells; the anterior tarsi of the female are three jointed, of the male five jointed; the abdomen is heavily chitinized, cylindrical, the first tergite joined to the thorax by its entire width but not becoming part of the second division of the body, the second segment united with the first by its entire width and not separated from it by a socket-like joint; the first two tergites are more coarsely sculptured than the following, and the suture between the second and third is foveolate. Lying below and on each side of the eighth tergite in the female is a large heavily chitinized plate, the two together forming ventrally a channel for the reception of the ovipositor, and each bearing at its tip a small triangular appendage. These plates apparently represent the fused ninth and tenth tergites which are longitudinally divided dorsally, and the appendages are apparently the cerei; the eighth sternite is internal and lies above and somewhat behind the ninth, and is represented by two triangular plates, from the upper angle of which originate the lancets (first gonopophyses),¹ the ninth sternite is also internal, lying below and in front of the eighth and represented by two more or less triangular plates which extend postero-ventrad; the lance (second gonopophyses) originates from the inner ends of these plates and becomes fused a short distance cephalad of its origin; the two parts of the sheath (third gonopophyses) arise from the apices. Shortly cephalad of the origin of the lance and lancets the latter enter the groove of the former, the complete ovipositor as thus formed extending cephalad in an inverted position enclosed within a membranous sac, probably invaginated intersegmental skin, into the mesothorax, where it is coiled, and returning upon itself continues caudad in its normal position and enters the base of the sheath.

The reason for the formation in the pupa of the long external ovipositor is inexplicable, and its reduction to the form existing

¹ Snodgrass (Tech. Ser. 18 Bur. Ent. U. S. Dept. Agr., 1910, p. 25). Numbers were, outer gonopophyses of the ninth sternite 2 and the inner 3. This numbering is not in accord with the numbering further on in the work. In the present paper the numbering of the gonopophyses of the 9th sternite as given by Snodgrass on p. 25, figures 7 and 8, is reversed.

in the adult is equally inexplicable. This is rendered all the more difficult to understand by the fact that in the prepupa the ovipositor is coiled as it is in the adult, while in the pupa it forms a simple loop in the thorax.

In the male the abdomen is composed largely of eight large visible tergites and nine sternites (the first being a small plate concealed under the coxae). Lying between the apices of the 8th tergite and 9th sternite are two small plates connected by weakly chitinized tissue with the 8th tergite; the exact nature of these is not clear; but apparently the connecting tissue is the fused 9th and 10th tergites and the plates themselves are the cerci. The 10th sternite is apparently fused with the large ninth and the appendages which make up the genitalia do not materially change the appearance of the 8th and 9th sternites.

Larval characters:—The larva of only one species is known and what characters are known will be found in the above description of the larva of *Oryssus*.

Key to suborders of Hymenoptera.

Adults and pupae.....	1
Larva.....	3
1. The first abdominal segment so consolidated with the thorax as to be a part of the second division of the body, the posterior part of which bears a spiracle; the separation between the first (propodeum) and second abdominal segments marked by a distinct socket form articulation; in short the abdomen is divided into two parts, propodeum and gaster.....	<i>Clistogastra</i> Konow.
— The first abdominal segment not forming a part of the second division of the body; the first (basal plates or propodeum) and second abdominal segments united by their entire width and not separated by a socket like articulation; in short the abdomen is not divided into two parts.....	2
2. Metapostnotum wanting; antennae inserted much below the lower margin of the eye; wings with two cubital cells and with only one recurrent vein; ovipositor concealed within the body and extending anteriorly so it is coiled in the mesothorax.	<i>Idiogaster</i> Rohwer and Cushman.
— Metapostnotum present; antennae inserted above lower margin of eye; wings with more than two cubital cells and with two recurrent veins; ovipositor not concealed or extending anteriorly into the thorax.....	<i>Chalastogastra</i> Konow.
3. Mouthparts more or less complex, maxillary and labial palpi distinctly jointed; antennae usually jointed.....	<i>Chalastogastra</i> .
— Mouthparts much reduced, palpi, if present soft and papilla-like; antennae like palpi; ocelli wanting.....	4

4. Palpi apparently not present; mandibles tridentate, the middle tooth longest, lateral teeth equal..... *Idiogastra*.
 -- Palpi papilliform; mandibles various, if dentate the ventral tooth is longest..... *Clistogastra*.

GENUS *ORYSSUS* LATREILLE.

In originally proposing the genus *Oryssus* Latreille used the spelling *Orussus*, but in his later works he corrected this lapsus to *Oryssus*. This later spelling is the better form and has been the one constantly used and should therefore be retained.

In Mr. Rohwer's synopsis of the North American species of *Oryssus* (Proc. U. S. Nat. Mus., vol. 43, 1912, pp. 141-158) the shape of the hypopygium was used as a specific character and from the material which was examined at that time it held very satisfactorily. Considerable new material coming in from the West and from the East indicates that although these characters hold for a great proportion of the specimens there occasionally arises a case when it is difficult to determine in which group the individual should be placed. It seems therefore that this cannot be used as a specific character especially as all of the individuals in one of the recent series came from the same locality at the same time and under similar conditions. So far in the material now available the emargination of the facial flange (= clypeus, authors) proves reliable but it seems possible that this character too may be found to vary. If this is the case Group B. II will be a species and known as *occidentalis*.

***Oryssus terminalis* Newman.**

Oryssus terminalis Newman, Ent. Mag., vol. V, 1838, p. 486; Rohwer, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 150.

Oryssus haemorrhoidalis Harris, Rept. Insects of Mass., 1841, p. 394; Rohwer, i.e., p. 151.

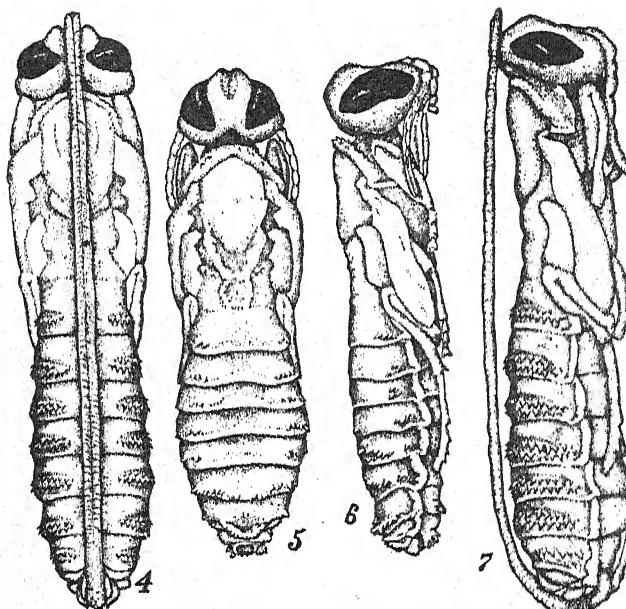
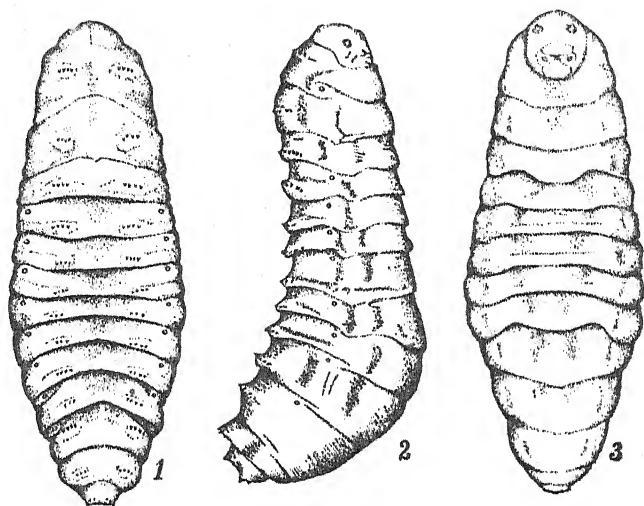
A number of specimens of this species have been collected around Harrisburg by W. S. Fisher. We have not yet been able to locate a male to go with this female, and it is possible that the male of this species will have the abdomen entirely black and that it is at present confused under the name, *sayi*.

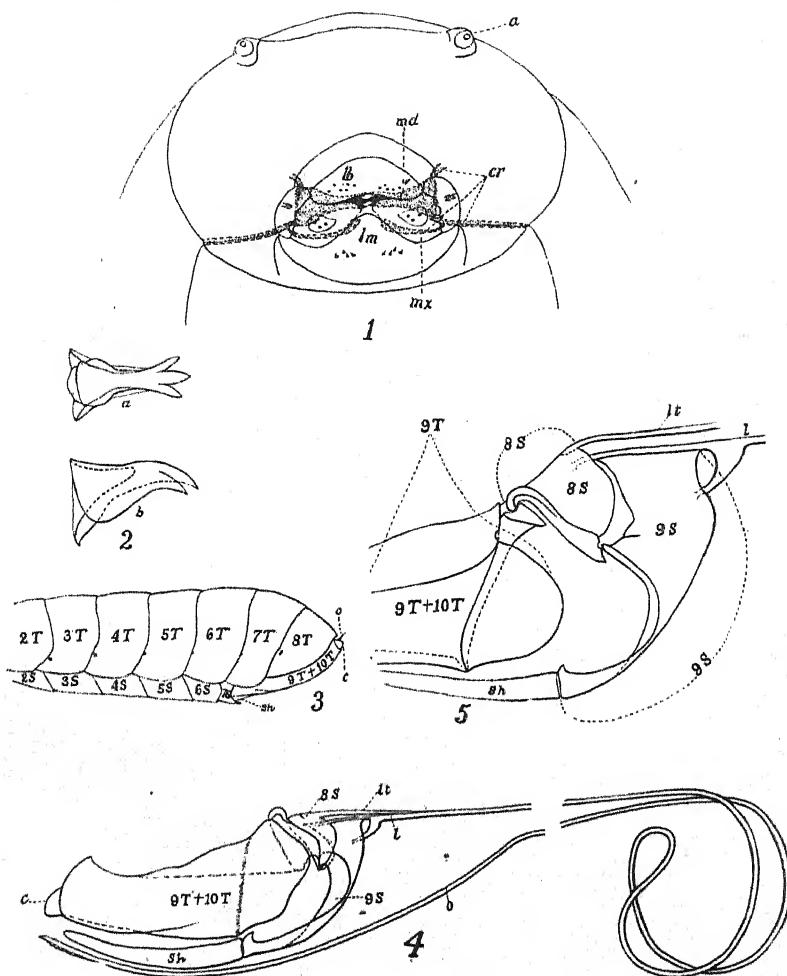
***Oryssus occidentalis* Cresson.**

Oryssus occidentalis Cresson, Proc. Ent. Section, Acad. Nat. Sci., Phila., 1879, p. 9; Rohwer, i.e., p. 153.

Oryssus abietis Rohwer, i.e., p. 153.

In a series of specimens collected recently by Mr. Burke and his associates there are a few individuals which are intermediate in the shape of the hypopygium between the type of *occidentalis*





and the type of *abietis* and it seems that they represent only one species. In the male the yellow varies from continuous inner orbital line to superorbital spots.

EXPLANATION OF PLATES.

Plate XI. *Oryssus occidentalis* Cress. Drawn by Miss Eleanor Armstrong.

Fig. 1. Larva, dorsal view. Fig. 2. Same, lateral view. Fig. 3. Same, ventral view. Fig. 4. Female pupa, dorsal view. Fig. 5. Male pupa, dorsal view. Fig. 6. Male pupa, lateral view. Fig. 7. Female pupa, lateral view.

Plate XII. *Oryssus occidentalis* Cress. Drawn by R. A. Cushman.

Fig. 1. Larva, facial view of head; *a*, antennae; *lb*, labrum; *lm*, labium; *md*, mandible; *mx*, maxilla; *cr*, chitinized ridges for articulation of mandibles. Fig. 2. Larva, mandible; *a*, internal view; *b*, ventral view. Fig. 3. Abdomen of female from side. Fig. 4. Detail of ovipositor and apical segments from side. Fig. 5. Detail of ovipositor, dorso-lateral view; *T* = tergite; *S* = sternite; *l* = lancet; *l* = lance; *sh* = sheath; *o* = ovipositor; *c* = cerci.

In discussion Mr. Baker thought the elevation of the Oryssidae into a suborder would necessitate other changes in the classification of the Hymenoptera. He pointed out the generally understood position of the Oryssidae and its seeming relation with the Siricidae. He stated that in the separation of the scutellum, the one tibial spur, the loss of the notauli, proepimeron, etc., the two families show striking affinities as well as a resemblance in the wings. The entirety of the median plate and the specialization of the head has been known even while placing the family close to the Siricidae. Even the parasitic habit was indicated years ago by Harrington. The remaining characters then, on which the suborder is erected are, Mr. Baker thought, structures in the early stages and modifications of the ovipositor due to parasitic mode of life. He thought that Ashmead may have had some notion of these structures when he suggested the family as the possible ancestor of some of the parasitic forms. Mr. Baker also pointed out that out of five genera, excluding *Lithoryssus*, and numerous species, the immature stages of only one species had been studied and adults of only one dissected. It is possible he thought that others might show some differences and at any rate he claimed that if the suborder were erected it would

seem to carry with it the erection of some suborders in the *Petiolata*.

Replying to Mr. Baker's remarks, Mr. Rohwer said, "I do not believe that the differences between the various groups of the *Clistogastra* are as great or of such a fundamental character as the differences between the *Idiogastra* and *Chalastogastra* but if any one can point out such differences I would be willing to recognize such as being of subordinal value."

THREE HUNDRED AND SECOND MEETING,

MARCH 1, 1917.

The 302d regular meeting of the Society was entertained by Dr. L. O. Howard at the Saengerbund Hall, March 1, 1917. There were present Messrs. Barber, Borden, Böving, Busck, Caudell, Cole, Cory, Cushman, Dietz, Duckett, Fink, Gahan, Garman, Gibson, Greene, Howard, Hyslop, Middleton, Pierce, Poponoe, Quaintance, Rohwer, Sanford, Sascer, Schwarz, Snyder, Walton, and Wood, members, and Messrs. G. H. Cole, H. F. Loomis, H. S. McConnell, H. K. Plank, and E. H. Siegler, visitors; 28 members and 5 visitors.

Rev. J. A. Corcoran, of Loyola College, Montreal, Canada, was elected a corresponding member.

Under the head of program, the following papers were presented:

CODLING MOTH INVESTIGATIONS IN THE GRAND VALLEY OF COLORADO.

By E. H. SIEGLER.¹

NOTES ON A BETHYLID PARASITE OF THE PINK BOLLWORM.

By AUGUST BUSCK.¹

KEY TO THE NEARCTIC SPECIES OF LEPTOYPHA AND LEPTOSTYLA

By W. L. MCATEE.¹

Withdrawn from publication.

FIRST LIST OF THE DERMAPTERA AND ORTHOPTERA OF
PLUMMERS ISLAND, MARYLAND, AND VICINITY.

BY W. L. McATEE AND A. N. CAUDELL.

In this paper are summarized the results of collecting of Dermaptera and Orthoptera by members of the Washington Biologists' Field Club and others upon Plummers Island, Maryland, and along the Potomac River from Great Falls to Little Falls. (See Pl. XIII.) Like most localities this region yields species verging on the southern border and others on the northern border of their ranges. Such cases always of interest to the student of geographical distribution, are particularly so here along the boundary between the Piedmont Plateau and the Atlantic Coastal Plain.¹ Species which have a more northerly or highland distribution include: *Diapheromera femorata*, *Spharagemon bolli*, *Melanoplus scudderi*, *M. atlantis*, *Conocephalus saltans*, *Atlanticus americanus*, *A. davisi*, *Ceuthophilus gracilipes*, *Nemobius maculatus*, *N. bruneri*, and *N. confusus*. Species more characteristic of the lowland and southerly regions, that occur in our area are: *Ischnoptera divisa*, *I. couloniana*, *Neocoenocephalus exiliscanorus*, *N. caudellianus*, *N. palustris*, *Orchelimum laticauda*, *Falcicula hebardii* and *Hapithus quadratus*.

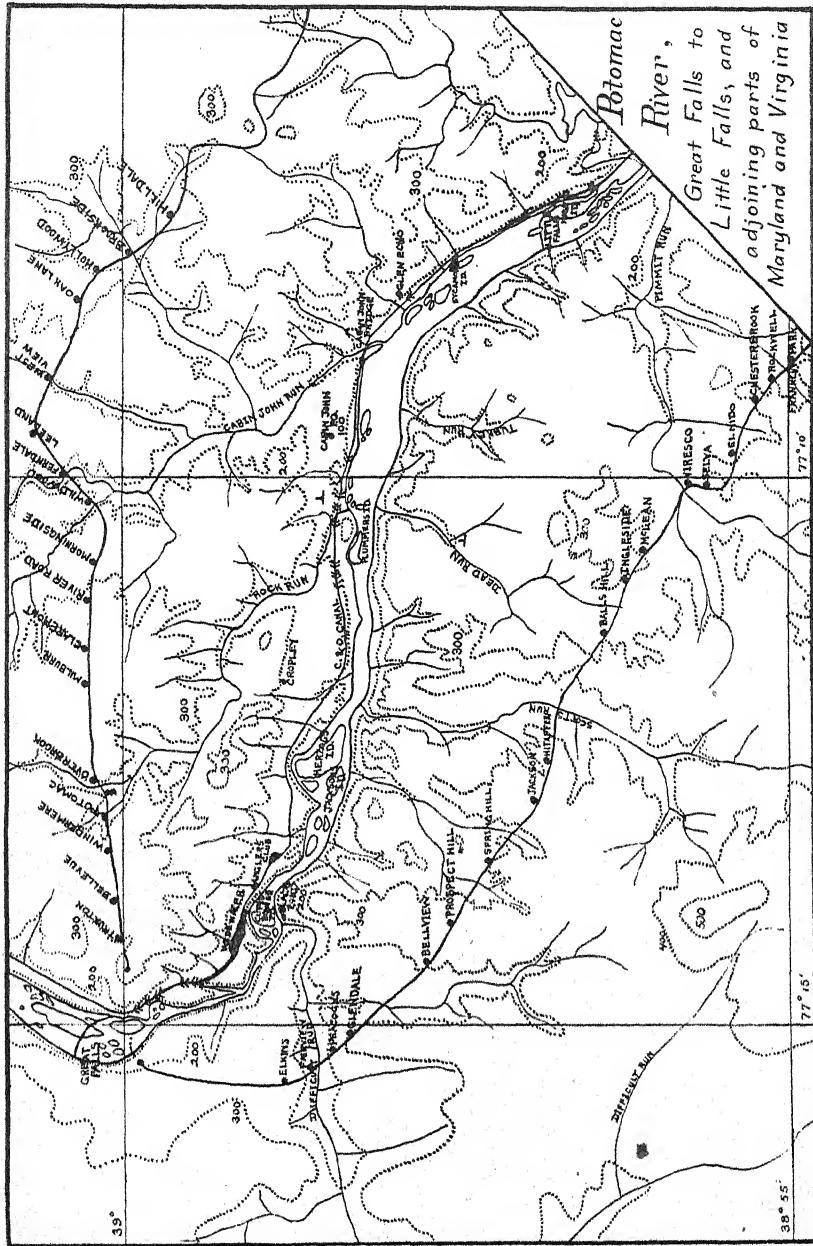
The number of species included in the present list by families is: Labiidae, 1; Forficulidae, 1; Blattidae, 7; Mantidae, 1; Phasmidae, 2; Acrididae, 36; Tettigoniidae, 33; Gryllidae, 24; a total of 105.² Of this number 72 species have been taken on Plummers Island itself.

The island has an area of about 12 acres, and considering its topography the number of species of Orthoptera is high. Approximately half of the entire area is wooded lowland and it is flooded usually from 1 to 3 times annually. The higher parts of the island are rocky and the greatest elevation is 75 feet above river level. The southern exposure of the island is warm and often dry, while the northern is shaded, cooler, and usually damp. Otherwise there is little variety of ecologic conditions; there is no stream nor permanent standing water on the island, nor any open grassland.

The collectors of the material upon which this paper is based are named on subsequent pages in connection with the records of specimens taken. The points at which collecting was done may be located on the accompanying map. In this connection it is

¹ See Rehn and Hebard, 1916 (2).

² The number of species of the same groups in the list for the State of New Jersey (Ann. Rep. N. J. State Museum, 1909) is 154.



well to draw attention to a method of labelling specimens from the vicinity of Plummers Island which has resulted in erroneous records being published. This is the use of red-spotted Plummers Island labels for specimens not taken on the island. The red spots were placed so as to indicate (map-wise) the direction from the island of the place where the specimens were taken. This system has been superseded by the use of labels such as "Maryland near Plummers Island" and others as required.

The working up of the fauna of Plummers Island has been one of the principal objects of the Washington Biologists' Field Club since it occupied the island in 1901. The present paper is the second formal list of insects for the island, the first being "An Annotated List of the Thysanoptera of Plummers Island, Maryland," by J. D. Hood (Ins. Insc. Mens. 5, Nos. 4-6, April-June, 1917, pp. 53-65). The species of syrphid flies, occurring upon Plummers Island and in the neighborhood, are indicated in "District of Columbia Diptera: Syrphidae," by Nathan Banks, C. T. Greene, W. L. McAtee, and R. C. Shannon. (Proc. Biol. Soc., Wash., 29, 1916, pp. 175-6.)

DERMAPTERA.

Labiidae.

Labia minor Linnaeus.

Apparently scarce; taken on Plummers Island, July 4, 1900, at light, H. S. Barber; September 10 and 24, H. S. Barber and E. A. Schwarz, and on Maryland shore near Plummers Island, May 23, 1915, McAtee.

Forficulidae.

Doru aculeatum Seudder.

A single female nymph of a *Doru* was taken by McAtee while sweeping vegetation in a swamp near Great Falls, Va., August 11, 1915. The identity of the species was in doubt until at the same spot October 4, 1916, the same collector obtained numerous adults of both sexes. They were sitting on sedge stems.

ORTHOPTERA.

Blattidae.

Ischnoptera couloniana Saussure.

Chain Bridge, Va. (Rehn & Hebard, 1910, p. 436).

Ischnoptera deropeltiformis Bruner. (= *johsoni* Rehn.)

Numerous records, May 19 to November 3. On Plummers Island, June 15, 1915, H. S. Barber; July 1 and 7, R. P. Currie; July 8, 1904, at light, E. A. Schwarz; and August 5, 1915, at tulip tree sap, R. C. Shannon. Maryland near Plummers Island, June 18, 1908, H. S. Barber; Chain Bridge, Md., May 19, 1911; Great Falls, Va., May 19, and August 11, 1915, McAtee. Cabin John, Md., September 23, 1911, W. D. Appel.

Ischnoptera divisa Saussure and Zehntner.

Plummers Island, July 23, 1905, H. S. Barber; also June, 1912, with oötheca.

Ischnoptera pensylvanica De Geer.

Numerous records: Plummers Island, May 24 to July 14; at light, May 29, 1911, J. C. Crawford. Cupid's Bower Island, Md., June 7, 1915, W. Perham; Jackson's Island, Md., July 12, H. S. Barber; High Island, Md., female with fresh oötheca, July 1, 1904, Caudell; Great Falls, Va., July 12, H. S. Barber. Variety *inaequalis* taken on Plummers Island, July 10, 1910, McAtee.

Ischnoptera uhleriana Saussure.

The most common species of the genus: Plummers Island, May 20 to August 11; at light, May 23, 1911, P. R. Myers; July 9, 1902, H. S. Barber; with oötheca, August, 1912; nymphs, May 23, 1915; Jackson's Island, Md., May 18, 1902, H. S. Barber; nymphs collected at Cabin John Bridge, Md., March 27, 1902, matured May 9; Glen Echo, Md., July 11, 1914, with oötheca; some adults freshly matured and one with oötheca collected on High Island, Md., July 1, 1903, Caudell; Virginia near Plummers Island, June 10, 1902, H. S. Barber; May 17, 1908, nymph in nest of *Formica obscuriventris*, McAtee.

Blatella germanica Linnaeus.

Only one specimen taken April 15, 1906, McAtee, that in house at Plummers Island, where it undoubtedly was carried in a parcel of provisions.

Cryptocercus punctulatus Scudder.

This widely but sparsely distributed roach was captured on Cupids Bower Island, Md., June 23 and June 31, 1915, by H. S. Barber and R. C. Shannon, respectively. The specimens were obtained from rotten pine logs.

*Mantidae.***Stagmomantis carolina** Johansson.

Strange to say the mantis has not yet been taken on Plummers Island, and it appears to be scarce along the upper river, though it is common enough in some directions from Washington. High Island, Md., September 29, 1902, large nymph, Caudell; Black Pond, Va., September 14, 1913, W. D. Appel; Chain Bridge, Va. August 17, 1912, Caudell.

*Phasmidae.***Diapheromera femorata** Say.

Common, sometimes abundant. Plummers Island: Nymphs may be seen as early as April, become more conspicuous as the summer progresses, mature and are seen mating in September; latest adult collected November 15, 1912, H. S. Barber. One obtained November 7, 1901 (R. P. Currie) lived in captivity 2 days during which period it laid 3 eggs. Great Falls, Md., September 4, 1899; Great Falls, Va., September 12, 1912, mating; October 4, 1916, Caudell; Difficult Run, Va., October 3, 1915, McAtee; Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Manomera blatchleyi Caudell.

Plummers Island, July, 1907, W. Palmer; October 28 and November 15, 1912, H. S. Barber; Great Falls, Md., July 30, 1916, Caudell.

All these specimens are females, no males having been seen. This is also true of the many similar specimens taken on Long Island, N. Y., by Wm. T. Davis and there is a possibility that this may prove to be another species than *blatchleyi*. This has formerly been recorded as *Diapheromera veloci*.

*Acrididae.***Nomotettix cristatus compressus** Morse.

Maryland near Plummers Island, October 22, 1915, McAtee; Chesapeake and Ohio Canal, Seven-locks, Md., April 27, 1914, L. O. Jackson; Great Falls, Va., September 12, 1912, October 4, 1916, Caudell; May 19, 1915, McAtee; Bellview to Difficult Run, Va., September 19, 1916, Caudell; the long-winged form, *atavus* Blatchley, Maryland near Plummers Island, October 22, 1915, McAtee.

Acrydium arenosum angustum Hancock.

Common; Plummers Island; March 30 to October 13; Maryland near Plummers Island, April 6, 1913, W. D. Appel; April 16, 1916, D. C. Abbott; Cabin John Bridge, Md., September 23, 1900, Caudell; May 10, 1913, W. D. Appel; Great Falls, Va., April 20, 1916, October 4, 1916, McAtee; August 5, 1904, Caudell; May 19, 1915, L. O. Jackson; Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Acrydium ornatum Say.

Great Falls, Md., August 5, 1904, Caudell; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Virginia shore above Plummers Island, Md., October 14, 1914, R. C. Shannon; Maryland near Plummers Island, April 1, 1916; Plummers Island, Md., July 27, 1916, McAtee.

Neotettix bolivari Hancock.

Great Falls, Va., August 1, 1916, McAtee.

Neotettix femoratus Scudder.

Virginia near Plummers Island, June 20, 1905, McAtee.

Paratettix cucullatus Burmeister.

Common; Plummers Island, April 21 to August 26; nymphs May 11, 17 and 19. Great Falls, Md., May 23, 1915, McAtee; Virginia near Plummers Island, June 3, 1902, R. P. Currie.

Tettigidea armata Morse.

Black Pond, Va., September 24, 1913, W. D. Appel. One ♀.

Tettigidea lateralis Say.

Common; Plummers Island, March 27 to October 12; in copula May 5, 1912, J. C. Crawford. Maryland near Plummers Island, January 18 to September 1; Cabin John Bridge, Md., May 10, 1913, W. D. Appel; Great Falls, Va., May 19, 1915, October 4, 1916, McAtee; Black Pond, Va., May 21, 1911, Virginia near Plummers Island, October 25, 1914, Chain Bridge, Va., May 18, 1913, W. D. Appel.

Tettigidea lateralis Say variety **polymorpha** Burmeister.

More common than typical variety; Plummers Island, March 24 to October 26; in copula July 14 and 21, 1907, A. K. Fisher; Angler's Club, Md., August 15, 1915, nymph, McAtee; Maryland near Plummers Island, April 5, 1912 (in copula), to August 18;

Cabin John Bridge, Md., April 19, 1905, (in copula) to May 5; High Island, Md., November 10, 1901; Great Falls, Va., June 10 to October 4, in copula, August 1; Bellview to Difficult Run, Va., September 19, 1916; Virginia near Plummers Island, April 18 to July 24; Chain Bridge, Va., May 23, 1905, adult male in spider's web, Caudell.

Tryxalis brevicornis Linnaeus.

Plummers Island, September 29, 1915; Great Falls, Md., August 15, 1915, common in both green and brown phases, on vegetation about pond bordering canal, McAtee.

Syrbula admirabilis Uhler.

Great Falls, Md., August 15, 1915, McAtee; Maryland near Plummers Island, August 18, 1916; Glen Echo, Md., July 10, 1914, nymph, Caudell; Dalecarlia Reservoir, D. C., August 22, 1915; Bellview to Difficult Run, Va., September 19, 1916, Caudell; October 3, 1915; Virginia near Plummers Island, September 29, 1915, McAtee; Chain Bridge, Va., September 13, 1916, Caudell.

Eritettix simplex Scudder.

Maryland near Plummers Island, May 9, 1915, McAtee; Cabin John Bridge, Md., May 10, 1913; Glen Echo, Md., February 2, 1913, nymphs, W. D. Appel; July 10, 1914, Morgan Hebard (Rehn and Hebard, 1916 (2), p. 159); Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Orphulella petidna Burmeister.

Plummers Island, September 2, 1904, Caudell; Great Falls Md., August 15, 1915, Bellview to Difficult Run, Va.; September 11, 1916; Maryland near Plummers Island, May 9, 1915, McAtee; Glen Echo, Md., July 10, 1914, Caudell; Dalecarlia Reservoir, D. C., August 22, 1915, Bellview to Difficult Run, Va., October 3, 1915, McAtee.

Orphulella speciosa Scudder.

Glen Echo, Md., August 10, 1905, July 10, 1914, Caudell.

Dichromorpha viridis Scudder.

Plummers Island, July 13 to August 29; nymphs July 14 and August 27; Great Falls, Md., August 5, 1904, Caudell, August 15, 1915, McAtee; Maryland near Plummers Island, June 17, 1913, W. D. Appel; July 14, 1915; Little Falls, D. C., August 22, 1915; Bellview to Difficult Run, Va., September 19, 1916, McAtee;

Great Falls, Va., nymphs, August 5, 1915, September 12, 1912, Caudell, October 4, 1916, McAtee; Chain Bridge, Va., September 13, 1916, Caudell.

Chloealtis conspersa Harris.

Glen Echo, Md., July 10, 1914, many of both sexes, all mature except one large female nymph; in edge of open woods, Caudell; Great Falls, Va., October 4, 1916, McAtee.

Arphia sulphurea Fabricius.

Common; Plummers Island, adults May 4 to September 1, nymphs August 4 to October 12; Great Falls, Md., June 12, 1904, Caudell; Maryland near Plummers Island, March 9 to May 9, 1915, McAtee; Cabin John Bridge, Md., May 10, 1913, W. D. Appel; Glen Echo, Md., July 10, 1914, Caudell; Great Falls, Va., May 19, 1915, Virginia near Plummers Island, May 8, 1915, McAtee; Chain Bridge, Va., May 23. Some individuals have the hind femora conspicuously bifasciate externally while in others they are unicolorous.

Arphia xanthoptera Burmeister.

Plummers Island, April 29, 1905 (nymph), D. H. Clemons, June 10, 1906, July 16, 1905, October 12 and 27, 1906; Maryland near Plummers Island, September 29 and November 3, McAtee.

Chortophaga viridifasciata De Geer.

Very common; Plummers Island, nymphs April 5 to October 20, adults at intermediate dates; Great Falls, Md., May 23 and August 11, 1915, McAtee; Maryland near Plummers Island, April 1, 1916 (nymph), McAtee; May 9, 1913, W. D. Appel, May 9, 1915; July 2, 1916, McAtee; Cabin John Bridge, Md., May 4 and 10, 1913, W. D. Appel, March 27, 1902, many nymphs, some green, some brown, and some green with top of head, thorax, and abdomen reddish brown, Caudell; April 19; High Island, Md., November 10, 1901 (nymphs), Caudell; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Great Falls, Va., May 10 and 19, 1915, October 4, 1916 (nymph), McAtee; Scott's Run, Va., June 2, 1912, W. D. Appel, July 25, 1915, J. Silver; Chain Bridge, Va., September 13, 1916, Caudell.

Encoptolophus sordidus Burmeister.

Dalecarlia Reservoir, D. C., August 22, 1915, McAtee; Black Pond, Va., September 21, 1911, W. D. Appel, Bellview to Difficult Run, Va., September 19, 1916, Chain Bridge, Va., October 24, 1915, McAtee; September 13, 1916, Caudell.

Hippiscus phoenicopterus Burmeister.

Chesapeake and Ohio Canal, near Cabin John Run, Md., April 27, 1914, L. O. Jackson; Chain Bridge, Md., May 23, 1903, nymph collected which matured as a female June 14, Caudell; Great Falls, Va., May 19, 1915, nymph, McAtee; Virginia near Plummers Island, June 17, 1913; Chain Bridge, Va., October 24, 1915, nymph, L. O. Jackson.

Hippiscus rugosus Scudder.

Plummers Island, Md., October 1, 1905, McAtee; Conduit Road, opposite Plummers Island, Md., September 5 and 10, 1915, adults of both sexes Caudell; Bellview to Difficult Run, Va., October 3, 1915 and September 19, 1916, McAtee.

Hippiscus apiculatus Harris. (*tuberculatus* of authors.)

Great Falls, Md., May 23, 1915, McAtee; Maryland near Plummers Island, April 22, 1903, H. S. Barber; Cabin John Bridge, Md., May 10, 1913, Great Falls, Va., May 9, 1916, Bertha Currie; Black Pond, Va., May 21, 1911, W. D. Appel; Virginia near Plummers Island, June 20, 1909, McAtee.

Dissosteira carolina Linnaeus.

Plummers Island, Md., June 19, 1905, nymph, July 5, 1914, and July 16, 1905, McAtee; Great Falls, Md., August 5, 1904, Caudell; Maryland near Plummers Island, September 5, 1915, L. O. Jackson; Cabin John Bridge, Md., September 11, 1902, in copula, Caudell; September 23, 1911, W. D. Appel; Glen Echo, Md., July 10, 1914, nymphs and adults; Great Falls, Va., September 12, 1912, Caudell; October 4, 1916, McAtee; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Chain Bridge, Va., September 13, 1916, Caudell.

Spharagemon bolli Scudder.

Plummers Island, July 16, 1905, McAtee; September 2, 1904, Caudell; September 30, 1906, A. K. Fisher; Maryland near Plummers Island, August 18, 1916, Caudell; Great Falls, Md., August 15, 1915, McAtee; Great Falls, Va., September 12, 1912, Caudell; October 3, 1915, McAtee; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Schistocerca serialis Thunberg. (= *americana* Drury).

Maryland near Plummers Island, November 3, 1906, A. K. Fisher.

Schistocerca damnifica Saussure.

A common grasshopper, Plummers Island, October 27, 1906, I. J. Condit; November 3, 1906, A. K. Fisher; Great Falls, Md., May 23, 1915, McAtee; Maryland near Plummers Island, March 19 and 27, 1915, J. C. Crawford; April 23, 1916, August 15, 1915, McAtee; Cabin John Bridge, Md., May 10, 1913; High Island, Md., November 10, 1901, Caudell; Great Falls, Va., February 26, 1905, active adult, H. S. Barber, September 12, 1912, Caudell; October 3, 1915, McAtee; October 4, 1916, Caudell; Bellview to Difficult Run, Va., September 19, 1916, McAtee; Chain Bridge, Va., September 13, 1916, Caudell; October 24, 1915, L. O. Jackson.

Schistocerca rubiginosa Harris.

Cabin John Bridge, Md., August 18, 1914, H. Nicols.

Melanoplus atlantis Riley.

Great Falls, Md., August 15, 1915, McAtee; Maryland near Plummers Island, September 10, 1915, Glen Echo, Md., July 10, 1914, Caudell; Great Falls, Va., June 26, 1914, August 11 and October 3, 1915, McAtee; October 4, 1916, Caudell; Bellview to Difficult Run, Va., September 19, 1916; Virginia near Plummers Island, July 14 and September 29, 1915, McAtee; Chain Bridge, Va., August 17, 1912, September 13, 1916, Caudell.

Melanoplus collinus Scudder.

Great Falls, Va., September 12, 1912, many, one pair mating; October 4, 1916, Caudell; Bellview to Difficult Run, Va., September 19, 1916, McAtee.

Melanoplus femoratus Burmeister.

Maryland near Plummers Island, June 29, 1913, W. D. Appel; September 10, 1915; Glen Echo, Md., July 10, 1914, large nymphs and adults of both sexes, Caudell; Dalecarlia Reservoir, D. C., July 2, 1911, W. D. Appel; Great Falls, Va., August 15, 1915, McAtee; September 12, 1912, Caudell; October 4, 1916; Bellview to Difficult Run, Va., September 19, 1916, McAtee; Scott's Run, Va., July 25, 1915, L. O. Jackson; Chain Bridge, Va., September 13, 1916, Caudell.

Melanoplus femur-rubrum De Geer.

Plummers Island, September 5, 1915, McAtee; September 30 and October 7, 1906, A. K. Fisher; Great Falls, Md., August 15, 1915; Maryland near Plummers Island, August 16, 1916, Caudell;

September 5 and 29, 1915, McAtee; Cabin John Run, Md., October 10, 1915, L. O. Jackson; High Island, Md., November 10, 1901, Caudell; Little Falls, D. C., August 22, 1915, McAtee; Chain Bridge, D. C., September 7, September 13, 1916, Great Falls, Va., September 12, 1912, October 4, 1916; Bellview to Difficult Run, Va., September 19, 1916, Caudell; October 3, 1915, McAtee; Chain Bridge, Va., August 17, 1912, Caudell.

***Melanoplus punctulatus* Scudder.**

Plummers Island, Md., August 11, D. H. Clemons; Cabin John, Md., August, 1907, W. Palmer; Maryland near Plummers Island, August 18, 1916, Caudell; October 31, 1915 W. Stone (Rehn & Hebard, 1916 (2), p. 246); November 11, 1915, Hebard; Bellview to Difficult Run, Va., September 19, 1916; Great Falls, Va., September 5, 1916, McAtee; October 4, 1916, Caudell.

***Melanoplus scudderi* Uhler.**

Not so common as *M. femur rubrum* for instance but more frequently collected. Plummers Island, August 20 to October 27; in copula, August 20, September 10, October 11 and 23; nymphs, September 2 and 10; Maryland near Plummers Island, August 18, 1916, Caudell; September 5, 1915, McAtee; High Island, Md., November 10, 1901, Caudell; Dalecarlia Reservoir, D. C., August 22, 1915, McAtee; Chain Bridge, D. C., September 7; Great Falls, Va., September 12, 1912, Caudell; October 4, 1916, McAtee; October 31, 1915, in copula, L. O. Jackson; Bellview to Difficult Run, Va., September 19, 1916, McAtee; Chain Bridge, Va., August 17, 1912, September 13, 1916, Caudell; October 24, 1915, R. A. Emmons.

***Melanoplus tribulus* Morse.**

Plummers Island, Md., September 30, 1906, 1 ♀, A. K. Fisher; Difficult Run, Va., September 19, 1916, 1 ♂ adult, Caudell.

***Paroxya atlantica* Scudder.**

A single female taken at Great Falls, Va., August 11, 1915, by McAtee, is doubtfully referred here. A male is necessary for positive identification.

***Paroxya clavuliger* Serville. (= *floridana* Thomas.)**

Plummers Island, Md., August 15, 1902, nymph, H. C. Pratt; Great Falls, Md., August 15, 1915, McAtee; Maryland near Plummers Island, August 18, 1916, September 10, 1915, Caudell; and September 29, 1915, McAtee; Great Falls, Va., September

12, 1912, October 4, 1916, Caudell; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916, Caudell. A common species in wet places, particularly along the Chesapeake and Ohio Canal.

Tettigoniidae.

Scudderia curvicauda De Geer.

Great Falls, Va., July 23, 1914, Caudell and R. P. Currie, August 11, 1915, McAtee and September 12, 1912, Caudell.

Scudderia furcata Bruner.

Abundant; Plummers Island, August 24 to November 5; nymphs, August 27 and 29, one taken on latter date with large Tachinid larva in abdomen; Anglers' Club, Md., August 15, 1915, McAtee; Maryland near Plummers Island, August 3, 1913, W. D. Appel; August 18, 1916, Caudell; Cabin John Bridge, Md., September 2, 1907, F. Knab; September 23, 1911, W. D. Appel; October 10, 1915, L. O. Jackson; High Island, Md.; November 10, 1901, Caudell; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Great Falls, Va., September 12, 1912, Caudell; October 3, 1915, McAtee; October 4, 1916, Caudell; Pimmit Run, Va., September 6, 1907, F. Knab; Chain Bridge, Va., September 13, 1916, Caudell.

Scudderia texensis Saussure and Pictet.

Plummers Island, Md., August 27, 1909, Caudell. (Rehn & Hebard, 1914 (1), p. 296.)

Amblycorypha oblongifolia De Geer.

Common; Plummers Island, July 27 to October 23; Great Falls, Md., August 15, 1915, McAtee; Maryland near Plummers Island, August 3, 1913, W. D. Appel; August 18, 1916, Caudell; Little Falls, D. C., August 22, 1915, McAtee; Great Falls, Va., September 12, 1912; October 4, 1916, Caudell; Virginia near Plummers Island, September 5, 1915, McAtee; October 6, 1911, J. D. Hood; Chain Bridge, Va., September 13, 1916, Caudell.

Amblycorypha rotundifolia Seudder.

Common; Plummers Island, June 15 (nymph) to October 2; Glen Echo, Md., July 10, 1914, Caudell; Dalecarlia Reservoir, D. C., August 22, 1915, McAtee; Great Falls, Va., September 12, 1912, Caudell; Scott's Run, Va., July 25, 1915, J. Silver; Virginia near Plummers Island, September 4, 1903, H. S. Barber.

***Amblycorypha uhleri* Stal.**

Plummers Island, July 20, 1903, E. A. Schwarz; August 28, 1902, Barber and Schwarz; September 27, 1908, E. A. Schwarz; Maryland near Plummers Island, August 15, 1915; Great Falls, Va., October 3, 1915, October 4, 1916, McAtee.

***Microcentrum retinerve* Burmeister.**

Common; Plummers Island, July 26 (nymph) to November 3; Maryland near Plummers Island, August 18, 1916; Great Falls, Va., September 12, 1912, Caudell.

***Microcentrum rhombifolium* Saussure.**

Plummers Island, Md., August 28, 1902, Barber and Schwarz.

***Pterophylla camellifolia* Fabricius. (= *Cyrtophyllus perspicillatus* Auct. not of Burn.)**

Abundant; Plummers Island, July 7 to November 1; female found ovipositing in bark of black walnut tree, September 22, 1907, laid an egg in same kind of bark while in confinement next day, McAtee; October 1, 1905, a female was found ovipositing in bark at night, H. S. Barber.

***Neoconocephalus ensiger* Harris.**

Cabin John Bridge, Md., October 27, 1915, Caudell.

***Neoconocephalus exiliscanorus* Davis.**

Plummers Island, September 6, 1909, H. A. Allard; Maryland near Plummers Island, August 3, 1913, W. D. Appel; Great Falls, Va., July 29, Nathan Banks.

***Neoconocephalus palustris* Blatchley.**

Plummers Island, July 22, 1906 (nymph), McAtee; August 27, 1909, H. A. Allard; September 5 and 29, 1915, McAtee; October, 1907, W. Palmer; Black Pond, Va., September 21, 1911, W. D. Appel; Great Falls, Va., September 5, 1916, McAtee; Chain Bridge, Va., August 17, 1912, Caudell.

***Neoconocephalus retusus* Scudder.**

Plummers Island, September 2, 1904, September 29, 1907, McAtee (Rehn & Hebard, 1914 (3), p. 404); Chain Bridge, Va., August 17, 1912, September 13, 1916, Caudell; Great Falls, Va., September 5, 1916, October 4, 1916, McAtee; Bellview to Difficult Run, Va., September 19, 1916, Caudell.

***Neoconocephalus robustus* var. *crepitans* Scudder.**

Plummers Island, September 2, Caudell; September 17, 1904, H. A. Allard; September 29, 1907; Maryland near Plummers Island, July 27, 1913, McAtee. Plummers Island, August 29, 1912 (nymph), Caudell, September 1, 1907 (nymph), A. K. Fisher; Great Falls, Md., August 15, 1915 (nymph); Maryland near Plummers Island, August 16, 1914, McAtee.

***Neoconocephalus triops* Linnaeus.**

Plummers Island, August 2, September 4, 9, and 24, October 28, Barber and Schwarz; October 12, 1906, A. K. Fisher; Black Pond, Va., September 21, 1911, W. D. Appel.

***Orchelimum agile* De Geer.**

Plummers Island, August 25, 1912, McAtee; Great Falls, Md., Anglers' Club, Md., August 15, 1915, McAtee; Chesapeake and Ohio Canal, Md., September 25, 1911, Wm. T. Davis; Cabin John, Md., September 23, 1911, W. D. Appel; Great Falls, Va., September 12, 1912; Chain Bridge, Va., September 13, 1916, Caudell.

***Orchelimum laticauda* Redtenbacher.**

Common; Plummers Island, August 27 (nymphs and freshly matured adults) to October 26; Maryland near Plummers Island, September 10, 1916, L. O. Jackson; October 22, 1915, McAtee; Chesapeake and Ohio Canal, Md., September 25, 1911, Wm. T. Davis; Cabin John, Md., September 23, 1911, W. D. Appel; Little Falls, D. C., August 22, 1915, McAtee; Chain Bridge, D. C., September 13, 1916, Caudell; Great Falls, Va., September 12, 1912, Caudell; Bellview to Difficult Run, Va., October 3, 1915, McAtee, September 19, 1916, Caudell.

***Orchelimum minor* Bruner.**

Song heard on Plummers Island and many specimens taken on Maryland shore nearby, September 6, 1909, H. A. Allard; Great Falls, Va., September 12, 1912, Caudell.

***Orchelimum vulgare* Harris.**

Plummers Island, September 2, Caudell; September 5, 1915 (nymph and adults), L. O. Jackson and McAtee; September 30, 1906, A. K. Fisher; October 22, 1915, Great Falls, Md., August 15, 1915, Maryland near Plummers Island, August 18, 1916, Caudell; September 5, 1915, McAtee; Cabin John, Md., September 23, 1911, W. D. Appel; Cabin John Run, Md., October 10,

1915, L. O. Jackson; Great Falls, Va., September 12, 1912, Caudell (one of these specimens is remarkable in having 3 ventral spines on one hind tibia and 4 on the other; otherwise it is typical and the determination is very certain, A. N. Caudell); October 3, 1915, October 4, 1916, McAtee; October 31, 1915, L. O. Jackson; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916; Virginia near Plummers Island, September 5, 1915, McAtee; Chain Bridge, Va., August 17, 1912, Caudell.

***Conocephalus brevipennis* Scudder.**

Plummers Island, August 26, 1901, R. P. Currie; August 29, 1905, H. S. Barber; September 2, 1904, Caudell; September 5, 1915, McAtee; September 15, 1907, October 12 and 13, 1906, A. K. Fisher; Maryland near Plummers Island, August 18, 1916, Caudell; Great Falls, Md., August 15, 1915, McAtee; Cabin John Bridge, Md., October 1907 (long-winged form), W. Palmer; Dalecarlia Reservoir, and Little Falls, D. C., August 22, 1915, McAtee; Great Falls, Va., September 12, 1912, Caudell; October 3, 1915, October 4, 1916, McAtee; October 31, 1915, R. A. Emmons; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Chain Bridge, Va., August 17, 1912, September 13, 1916, Caudell.

***Conocephalus nemoralis* Scudder.**

The most common species of the genus: Plummers Island, August 25 to November 3; long-winged form, October 4, 1905, D. H. Clemons; Little Falls, D. C., August 22, 1915, McAtee; Chain Bridge, D. C., September 11, 1911, Caudell; Great Falls, Va., September 12, 1912, Caudell; October 3, 1915, McAtee; October 4, 1916, Caudell; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916, McAtee.

***Conocephalus saltans* Scudder.**

Cabin John Bridge, Md., October, 1907, W. Palmer; Bellview to Difficult Run, Va., October 3, 1915, McAtee; both short and long-winged females taken; this is the first eastern record for the long-winged form; Chain Bridge, Va., September 13, 1916, Caudell.

***Conocephalus strictus* Scudder.**

Dalecarlia Reservoir, D. C., August 22, 1915, McAtee; Chain Bridge, D. C., September 7; Chain Bridge, Va., September 13, 1916; Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Atlanticus americanus Saussure.

Plummers Island, August 11, 1907, McAtee; Cabin John Run, Md., September 19, 1911, W. T. Davis (Rehn & Hebard, 1916 (1), p. 81).

Atlanticus davisi Rehn and Hebard.

Plummers Island, Md., July 5, 1905, E. A. Schwarz; Great Falls, Va., June 16, 1910, W. T. Davis (Rehn & Hebard, 1916 (1), p. 67).

Atlanticus testaceus Scudder.

Common; Plummers Island, April 21 (nymph) to September 15; Cabin John Run, Md., June 20, 1911, W. T. Davis; Glen Echo, Md., July 10, 1914, Caudell (Rehn & Hebard, 1916 (1), p. 53); Chain Bridge, Va., May 18, 1913, W. D. Appel.

Camptonotus carolinensis Gerstaecker.

Fairly numerous; Plummers Island, July 3 (nymph) to September 17; this leaf-rolling species sometimes utilizes as a substitute for cocoons of its own making, the compartments in the seed pods of *Staphylea trifolia*. Great Falls, Va., July 29, N. Banks.

Ceuthophilus blatchleyi Scudder.

Plummers Island, September 2, Caudell; October, 1909, H. S. Barber.

Ceuthophilus gracilipes Haldeman.

Fairly common; Plummers Island, May 8 (nymph) to September 22 (adult and nymphs); Cabin John Run, Md., September, 1911, W. T. Davis (Rehn & Hebard, 1916, (2), p. 27); Virginia near Plummers Island, April 28 (nymphs) to October 6.

Ceuthophilus neglectus Scudder.

The dominant species of the genus; Plummers Island, March 28 to October 26; in copula, September 24, 1905, eggs laid, September 29, 1912; nymphs, June 15, 1915 (in burrows of ground-hog), H. S. Barber; October 11, 1906, Caudell; Jacksons Island, Md., August 27, 1902, H. S. Barber; Dalecarlia Reservoir, D. C., April 13, 1913, W. D. Appel; Great Falls, Va., September 12, 1912, Caudell; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916, Caudell; Virginia near Plummers Island, April 30, 1905, McAtee; September 22, 1905, D. H. Clemons; September 30, 1905 (in copula) H. S. Barber; November 5, 1905, F. Knab.

Ceuthophilus latens Scudder.

Plummers Island, September 24, 1905, mating. Barber; October, 1909, Barber; August 12, 1914, Shannon; July 29, August 2 and 5, 1914, Caudell. Difficult Run, Va., September 21, 1916, Caudell.

Ceuthophilus spinosus Scudder.

Cabin John Run, Md., September, 1911, W. T. Davis (Rehn & Hebard, 1916 (2), p. 274).

Ceuthophilus uhleri Scudder.

Plummers Island, August 2, 1914, R. C. Shannon; September 10, 1915, October 4, 1912, October 11, 1906, Caudell; Great Falls, Md., August 12, 1912; Cabin John Run, Md., September, 1911, W. T. Davis (Rehn & Hebard, 1916 (2), p. 269) Great Falls, Va., September 12, 1912, Caudell.

*Gryllidae.***Gryllotalpa hexadactyla** Perty. (= *borealis* Burmeister.)

A few specimens have been taken on Plummers Island, a young nymph in 1906 by A. K. Fisher, another August 18, 1912, by McAtee, and an adult male which was singing by R. C. Shannon, September 14, 1914.

Tridactylus terminalis Scudder.

Glen Echo, Md., May 11, 1903. A single specimen taken by O. H. Heidemann.

Ellipes minuta Scudder.

Common. Plummers Island, April 22 (nymph) to October 5; Maryland near Plummers Island, April 8, 1914, McAtee; April 27, 1914, L. O. Jackson; June 8, 1913, McAtee; Virginia near Plummers Island, April 27.

Myrmecophila pergandei Bruner.

Plummers Island, May 1, 1914, McAtee; May 6 and 16, 1902, H. S. Barber, August 15, 1913, McAtee; September 10, 1903, H. S. Barber; October 13, 1912, J. D. Hood; Virginia near Plummers Island in nest of *Formica*, May 17, 1908, McAtee.

Nemobius bruneri Hebard.

Plummers Island, October 11 and 12, 1906, Caudell, A. K. Fisher; Cabin John Run, Md., September 23, 1911, W. T. Davis.

Nemobius carolinus Scudder.

Plummers Island, September 3 and 7, 1914, R. C. Shannon; October 12, 1906, A. K. Fisher; Great Falls, Va., September 12, 1912, October 14, 1916, Caudell; October 3, 1915, McAtee; Dead Run, Va., August 29, 1912, Caudell.

Nemobius confusus Blatchley.

Plummers Island, August 26 and 28, 1912, parasitized nymphs, Caudell, H. S. Barber; August 27, September 3, 1914, R. C. Shannon; September 10, 1915; Cabin John Run, Md., September 9, 1911, W. T. Davis (Hebard, 1913, p. 492); Virginia near Plummers Island, September 4, 1903, Caudell; September 11, 1902, Barber and Schwarz; Dead Run, Va., August 29, 1912, Caudell; Great Falls, Va., October 4, 1916, McAtee.

Nemobius cubensis Saussure.

Montgomery County, Md., September 25, 1911, W. T. Davis (Hebard, 1913, p. 461). Mr. Davis assures us this record pertains to the vicinity of the Potomac between the District of Columbia and Plummers Island. Great Falls, Va., October 4, 1916, Caudell.

Nemobius fasciatus De Geer.

Plummers Island, July 28, 1907, nymph, A. K. Fisher; August 22, 1902, R. P. Currie; September 3, 1905, A. K. Fisher; October 11, 1906, H. A. Allard. Variety *vittatus* Harris, Plummers Island, August 29, 1905, H. S. Barber; October 7, 1906, A. K. Fisher; October 11, 1906, Caudell; Great Falls, Md., August 15, 1915, McAtee; Great Falls, Va., August 17 and September 12, 1912, Caudell; October 4, 1916, McAtee; Bellview to Difficult Run, Va., September 19, 1916, October 3, 1915, McAtee; Chain Bridge, Va., August 17, 1912, Caudell.

Nemobius maculatus Blatchley.

Common; Plummers Island, August 9 (nymphs and adults) to October 31; Great Falls, Md., August 5, 1904, in copula; Cabin John Run, Md., September 19, 1912, W. T. Davis; Great Falls, Va., August 11, 1915 (nymph), McAtee; September 12, 1912, Caudell; October 3, 1915, October 4, 1916, McAtee; October 31, 1915, L. O. Jackson; Virginia near Plummers Island, September 4, 1903, H. S. Barber; September 11, 1902, Barber and Schwarz; Dead Run, Va., August 29, 1912, Caudell; Bellview to Difficult Run, Va., September 19, 1916, McAtee.

Nemobius palustrus Blatchley.

Bellview to Difficult Run, Va., September 19, 1916, Caudell.

Gryllus assimilis Fabricius.

Variety *integer* Scudder, Great Falls, Va., May 19, 1915, McAtee; variety *neglectus* Scudder, Maryland near Plummers Island, June 8, 1913, McAtee; variety *pennsylvanicus* Burmeister, common, Plummers Island, May 23, to October 27; nymphs, June 30 and August 29; Maryland near Plummers Island, April 5, 1914, L. O. Jackson; April 6, 1913, W. D. Appel; Dalecarlia Reservoir, D. C., August 22, 1915; Great Falls, Va., May 19, 1915, McAtee; September 12, 1912, Caudell; October 4, 1916, McAtee; October 31, 1915, L. O. Jackson; Black Pond, Va., September 21, 1911, W. D. Appel; Bellview to Difficult Run, Va., September 19, 1916; Chain Bridge, Va., September 13, 1916, Caudell.

Miogryllus verticalis Serville.

Plummers Island, April 6, 1905, McAtee; June 9, 1905, Caudell; July 3, 1904, F. Knab; Great Falls, Va., October 4, 1916, Caudell; all of these nymphs; Great Falls, Md., an adult ♀, August 5, 1904 Mrs. Caudell.

Oecanthus exclamationis Davis.

High Island, Md., September 29, 1902. One female taken by Caudell.

Oecanthus angustipennis Fitch.

Plummers Island, September 9 to November 8; Chain Bridge, Va., August 17, 1912, Caudell; November 11, 1915, dead specimen, Hebard; Great Falls, Va., October 4, 1916, Caudell.

Oecanthus latipennis Riley.

Plummers Island, August 19 to October 31; September 2, 1904, singing at 3.30 a.m., H. S. Barber; Maryland near Plummers Island, July 27 and August 27, 1913, W. D. Appel; August 18, 1916, Caudell; Cabin John Run, Md., October 10, 1915, L. O. Jackson; High Island, Md., September 29, 1902; Black Pond, Va., September 14, 1913, W. D. Appel; Great Falls, Va., October 4, 1916, Caudell.

Oecanthus quadripunctatus Beutenmuller.

Bellview to Difficult Run, Va., September 19, 1916, Caudell; October 3, 1915, McAtee; Virginia near Plummers Island, October 19, 1914, R. C. Shannon.

Neoxabea bipunctata De Geer.

Plummers Island, June 18, 1907 (nymph) Caudell; July 19, 1905, Barber and Schwarz; July 19, 1914, McAtee; August 12, 1907, A. K. Fisher; August 16, 1916, H. L. Viereck; August 20, 1916, R. C. Shannon; September 9 and 29, Barber and Schwarz.

Anaxipha exigua Say.

Common; Plummers Island, April 10 (nymph) to October 7; Maryland near Plummers Island, June 26, 1904, Caudell; August 18, 1916, Caudell; August 20, 1916, H. L. Viereck; Cabin John Run, Md., July 8, 1903, Theo Pergande; October 10, 1915, L. O. Jackson; High Island, Md., July 14, 1904 (nymphs), September 29, 1902, Caudell; Dalecarlia Reservoir and Little Falls, D. C., August 22, 1915; Bellview to Difficult Run, Va., September 19, 1916, Caudell, McAtee; Great Falls, Va., August 11, 1915, McAtee; September 12, 1912, October 4, 1916 (nymph), Caudell; Virginia near Plummers Island, October 19, 1914, R. C. Shannon; Chain Bridge, Va., August 17, 1912, Caudell.

Falcicula hebardii Rehn.

High Island, Md., July 1, 1904, one female taken by Caudell; Maryland near Plummers Island, June 17, 1913, McAtee; a single female taken by sweeping.

Cyrtotipha columbiana Caudell.

Plummers Island, September 13, 1909 and September 24, 1902, Barber and Schwarz.

Phyllopalpus pulchellus Uhler.

Common; Plummers Island, July 28 (nymph) to September 15; Maryland near Plummers Island, August 3, 1913, McAtee; High Island, Md., September 29, 1902, Chain Bridge, D. C., September 13, 1916, Caudell.

Hapithus agitator Uhler.

Common; Plummers Island, August 17 to October 20; Maryland near Plummers Island, August 18, 1916, Caudell; Great Falls, Va., September 12, 1912, Caudell; October 4, 1916, McAtee; Black Pond, Va., September 14, 1913, W. D. Appel; Virginia near Plummers Island, September 11, 1902, Barber and Schwarz.

Orocharis saltator Uhler.

Common; Plummers Island, July 28 to November 8; nymphs August 14, 26, 29, and September 8 and 15; Virginia near Plummers Island, September 30, 1905, H. S. Barber, October 15,

1916, C. T. Greene and W. R. Walton; Great Falls, Va., October 4, 1916, Caudell.

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Record 15 species from Plummers Island and 25 other species from points within our area.

NOTES ON NORTH AMERICAN TACHINIDAE, INCLUDING THE DESCRIPTION OF ONE NEW GENUS.

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Doryphorophaga Townsend.

This is evidently a valid genus, with *Lydella doryphorae* Riley as the genotype.¹ Mr. Walton² has considered it expedient to retain *doryphorae* in *Neopales* (*Phorocera* of authors) "until

¹ Proc. Ent. Soc. Wash., Vol. 14, p. 164.

² Proc. U. S. N. M., Vol. 48, p. 183.

further and more reliable external characters, especially in the case of the male, are discovered." Apparently all students of the Tachinidae, including the author of *Doryphorophaga*, at the time of erecting the same, have overlooked the fact that the males of *doryphorae* possess two pairs of orbital bristles, as do the females. This point together with other general external characters of each sex appear to substantiate the validity of the genus, and amply separate it from *Neopales*.

Before the writer are 26 specimens (20 males and 6 females) of *D. doryphorae*, taken in Massachusetts, Penikese Island, Conn., New Jersey and Montana. Of these specimens, 20 males and 3 females show the presence of discal macrochaetae on the intermediate abdominal segments,¹ and 3 females have them absent. Thus, it is plain that this character is a variable one; within the limits of the species, as is also, the degree of the hairiness of the eyes in the female, which may vary from moderately hairy to almost absolute bareness. As far as known, *D. doryphorae* is a common parasite upon the potato beetle, *Leptinotarsa decemlineata* Say. Specimens from the western portion of the United States appear identical in every respect with those taken in the East.

For the present it is desirable to include two other described species under *Doryphorophaga*, namely, *D. aberrans* Townsend² and *Exorista dorsalis* Coq.³ These species are evidently congeneric, but as to whether they are congeneric with *D. doryphorae* remains for further study to determine. They differ in having the facial ridges ciliate at most, on the lowest third, the ocellar bristles vestigial (not wanting in any of the 13 specimens at hand) and the abdominal chaetotaxy of *aberrans* and *dorsalis* in relation to *doryphorae*, are in need of more extended investigation.

Following is a synopsis of the genus, as it now stands, together with a detailed description of *D. aberrans*. The generic description is written under the tentative assumption, that all three species herein included are congeneric.

Diameter of head at vibrissae less than at base of antennae, vibrissae usually placed on a level with the front edge of the oral margin, eyes hairy (sometimes almost bare in females of *doryphorae*). Facial ridges bristly on the lowest fourth to four-fifths, antennae nearly as long as the face,

¹ In several of the specimens discal macrochaetae are present on the second abdominal segment and absent on the third. These are included in the number of specimens showing the presence of discal macrochaetae.

² *D. aberrans* Town., Ent. News, Vol. XXVII, p. 217.

³ *Exorista dorsalis* Coq., Canad. Ent., XXX, p. 236.

sides of face on the lower half bare. Frontal bristles in a single row, descending to base of third antennal joint, two pairs of orbital bristles in each sex. Ocellar bristles normal or vestigial, proclinate; second joint of arista about as broad as long, cheeks approximately one-sixth as wide as the eye height. Antennae usually inserted on or slightly above the eye middle, the abdomen bearing marginal and usually discal macrochaetae. Apical cell open, ending just before wing tip, third longitudinal vein bearing several bristles at its base, other veins bare.

TABLE OF SPECIES.

- Ocellar bristles normal, abdominal segments on the basal third to one-half densely gray pollinose, apical pair of scutellar bristles usually vertical (common throughout the U. S.)..... *doryphorae* Riley.
- Ocellar bristles vestigial, apical pair of scutellar bristles not vertical.. 2
- Abdomen wholly brassy gray pollinose (Mass., Conn. and Virginia),
aberrans. Town.
Abdomen brassy gray pollinose on the second segment and an inverted triangular spot on the third concolorous, remainder of abdomen shining black (Mass., Pa. and Ga.)..... *dorsalis* Coq.

Doryphorophaga aberrans Town.

Length 6-9 mm. Front in male about three-fourths, in female about as wide as either eye, frontal vitta opaque brownish black, not as wide as sides of front. Posterior half of parafrontals golden yellowish pollinose, anterior half and the parafacials concolorous bright silvery gray pollinose. Antennae black or faintly fulvous, the third antennal joint in each sex about three times as long as the second, arista microscopically pubescent, thickened on approximately the basal fourth, sides of face from one-third to three-fifths as wide as the median depression. Thorax marked with four black vittae besides a short median vitta posterior to the transverse suture; three postsutural and three sternopleural macrochaetae. Scutellum clothed with erect bristly black hairs on the dorsum, bearing a discal pair, three pairs of long marginals and a shorter cruciate apical pair of macrochaetae. Legs black, front pulvilli not as long as the last tarsal joint, middle tibiae on the outer front side, each bearing a single strong bristle near the middle; hind tibiae pectinate with a row of bristles of unequal length. Abdomen with a narrow median black vitta, bearing discal and marginal macrochaetae. Wings hyaline, the costal and marginal cells frequently tinged with yellow, costal spine obsolete, third longitudinal vein usually with three bristles at its base, calypteres milky white. Puparium from 7-8 mm. in length, anal stigmata slightly raised, widely separated, the dorsal surface reticulated.

Described from 3 males and 7 females reared from *Doryphora decemlineata* Say by Mr. L. B. Ripley at New Haven, Conn., September 13, 1913, and by Messrs. C. W. Collins, C. E. Hood and R. T. Webber, Melrose Highlands, Mass.

Leskia Desv. and allies.

While reviewing Dr. Townsend's recent revision¹ of the several species included under *Leskia analis* Say, by the late Mr. D. W. Coquillett, it was evident to the writer, that errors certainly existed in the conclusions as arrived at by Dr. Townsend.

In attempting to diagnose Mr. Coquillett's study of the genus *Leskia*, it seems unquestionably apparent that he first included and erroneously determined *Leskiomima tenera* Wied. as *Leskia analis* of Say. He then described *Myobia depile*.² Later discovering his error he properly placed Wiedemann's *tenera* in the genus *Leskiomima* and made his *depile* a synonym of *Leskia analis*. Since the type of Say's *analisis* is not in existence, to my knowledge, and must thus remain an unknown factor, it is evidently proper to recognize Dr. Townsend's *Myobiopsis similis*, which is at least, a recognizable species.³ *Myobia depile* Coq., however, has been entirely overlooked in the paper under consideration.

Mr. C. W. Johnson has very kindly afforded the writer the opportunity of examining one of the types of *Myobia depile* Coq., and it is quite apparent that *Leskiopalpus calidus* Town. is synonymous. Hence, the genotype of *Leskiopalpus*, by present designation, is *L. depile* Coq.

Sipholekia occidentalis Coq.³*Myobia gilensis* Town.⁴**Spilochaetosoma** new genus.

Front at base of antennae produced nearly one-half the eye width, the antennae inserted rather below the middle of the eyes. Frontal bristles descending to the base of the third antennal joint, cruciate from vertex to base of antennae, reclinate from thereon to a point nearly half way down the parafacials. Outside of the frontal row of bristles a parallel row of bristles and scattered bristly black hairs to the eye margins. Parafacials twice as wide anteriorly as at their vertex. Orbital bristles absent, the ocellar bristles strong proclinate. Width of head at the oral margin as great as at the base of antennae; vibrissae cruciate, inserted far above front edge of oral margin, two or three bristles above each. Antennae descending to the middle of the face, the second and third joints of equal length, arista bare, the second joint as broad as long. Parafacials

¹ Smiths. Misc. Coll., Vol. 49, p. 627-629; Jan. 1916.

² Proc. Acad. Nat. Sci. Phil., p. 313; Sept. 1865.

³ Smiths. Misc. Coll.; Vol. 49, p. 628; Jan. 1916.

⁴ Psyche, 1897, 40.

on lower half bare, cheeks nearly one-half as broad as the eye height. Eyes densely hairy. Apical cell entering costa far before the extreme wing tip, open, fourth longitudinal vein appendiculate beyond bend. Abdomen ovate, bearing discal and marginal macrochaetae, the hypopygium considerably exerted and doubled forward beneath the venter. Type, the following species.

Spilochaetosoma californica new species.

Male: Robust, black, first and second antennal joints, palpi, tip of proboscis, sides of first three abdominal segments and hypopygium yellow. Frontal vitta opaque velvety dark brown, parafrontals and fascia silvery pollinose with a faint golden tinge in certain reflections. Sides of face approximately one-half as wide as the median depression, cheeks thickly beset with bristly black hairs. Proboscis short, shining black and chitinized on the intermediate third, fleshy at the tip. Front at vertex nearly one-half the eye width. Thorax gray pollinose, marked with four prominent black vittae. Postsutural dorso-central bristles three, sternopleurals four. Apical two-thirds of scutellum yellowish, bearing three pairs of long marginal macrochaetae and a strong discal pair. Legs black, front pulvilli about one and one-half times as long as the last tarsal joint. Middle tibiae bearing a row of four long stout bristles on the outer front side, the hind tibiae pectinate with a row of bristles of unequal length.

Hairs of abdomen depressed. Second abdominal segment bearing a discal and a marginal pair of macrochaetae, the third a discal pair and a marginal row, and the fourth segment a discal and marginal row. Hypopygium bearing many stout black bristles upon the first and second segments. Wings faintly infuscate along the costa, veins brownish, the third longitudinal vein bearing six or seven bristles at its base, posterior end of hind cross-vein nearer the margin of the wing than to the small cross-vein. Calypteres whitish.

Described from a male specimen taken in the mountains near Claremont, Calif., by Mr. Carl F. Baker.

Holotype—U. S. N. M. Cat. No. 20,930.

Under the head of notes and exhibition of specimens the following were given:

THE ELATERID GENUS OISTUS OF CANDEZE.

By J. A. HYSLOP,

Bureau of Entomology.

The genus *Oistus* was described by Candèze to include two Mexican elaterids of the tribe Chalcolepidiini. The genus is very unsatisfactorily distinguished from the Oriental genus *Campsosternus*, the chief differential character used by the great

French Entomologist being the shape of the mandibles which, in a specimen of *Oistus sphenosomus* Cand. in the National Museum collection and determined by Mr. Champion, are decidedly acute at the tip while the mandibles of the specimens of *Oistus cacicus* Cand. in the same collection are truncate as in the original generic diagnosis. The genus includes at present, comprehending the species herein described, five species.

In a collection of miscellaneous elaterids collected by the field agents of the Office of Forest Insect Investigations and submitted to me for determination by Dr. A. D. Hopkins, I found a single female belonging to this genus which is described below.

***Qistus edmonstoni* sp. nov.**

Elongate, subparallel, depressed, shining. Color, sanguineous brown above; head, antennae, legs, and ventral surface almost black. Vestiture, long, silky and white. Head not margined in front, flattened, slightly concave and strongly punctate; mandibles acute at the tip; maxillary palpi long, terminal joint securiform; antennae moderately long and slender. Prothorax broader than long, sides nearly parallel, rounded in front, posterior angles divergent, lateral margins strongly swollen and sulcate, anterior margin rounded over the head, with a decided median emargination, posterior margin crenulate within the posterior angles; proplurae densely and strongly punctate; prosternum rounded in front with chin piece rugosely punctate, smooth and feebly punctate posteriorly. Meso-metasternal suture almost obliterated; mesosternum horizontal posteriorly and abruptly, perpendicularly deflexed in front. Posterior coxae gradually widened inwardly. Elytra four times as long as the prothorax, wider than pronotum, not striate but with three slightly elevated ridges; very finely punctate; sides parallel to apical third and then rather obliquely attenuated. Tarsi pilose beneath but not nearly so strongly as in *O. caccius* Cand.; tarsal joints three and four very feebly produced below, not at all lobed. Length 27 mm., width 7.5 mm.

Type:—U. S. N. M. No. 21044, a female.

Type locality:—Ashland, Oregon, on cone of Douglas Fir, Sept. 23, 1913.

The type was collected by Mr. W. D. Edmonston for whom the species is named.

The following table will serve to separate the species now recognized:

- a. elytra metallic black or black with suture red.
 - b. entirely metallic black except the legs which are brown. *submetallicus*
 - bb. prothorax red, elytra black with suture red.....*suturalis*
 - aa. elytra reddish brown, yellowish or piceous.

- c. tarsi broadly cordiform.
- d. prothorax with smooth bare spots on either side of disc before middle, elytra marmorately pilose.....*cacicu*s
- dd. prothorax without smooth bare spots on the disc, vestiture of elytra not marmorate.....*sphenosomu*s
- ee. tarsi with joints feebly broadened, not cordiform.....*edmonstoni*

Oistus Candeze, Monogr. Elat. I, p. 338, 1857.

1. *Oistus cacicus* Cand. 1857 Monogr. Elat. I, p. 339, Pl. VI, fig. 5 (type of the genus by present designation). Champion 1894, Biol. Cent. Amer. Col. III, pt. 1, p. 292, Pl. XIII, fig. 8.
2. *Ludius cacicus* Dej. 1833 Cat. ed. 3, p. 107, Cand., i.e. *Oistus griseosignatus* (Dupont i. litt.) Gem. and Har. Cat. Col. V, p. 1506.
3. *Oistus suturalis* Champion. 1894 i.e. p. 553, Pl. XXIV, fig. 5. Schwarz 1906 Gen. Ins. 46, Pl. II, fig. 13.
4. *Oistus submetallicus* Dand. 1900 Ann. Soc. Ent. Belg., Vol. 44, p. 83.
5. *Oistus edmonstoni* Hyslop 1917 above.

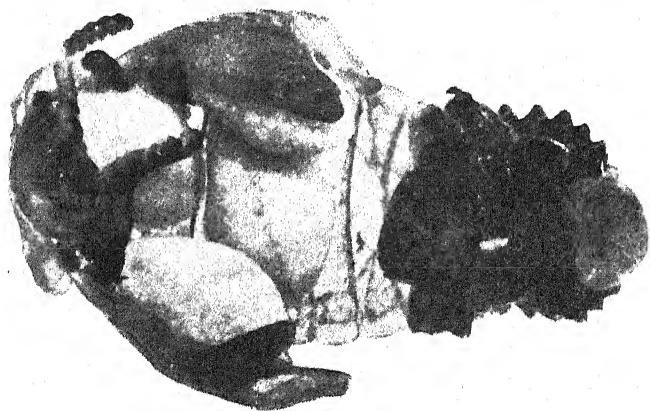
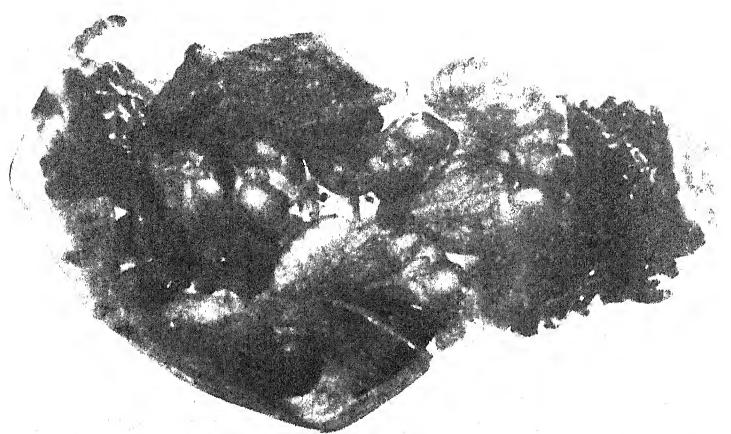
NOTES ON THE BIOLOGY OF SCHIZONOTUS SIEBOLDII RATZ.¹

BY R. A. CUSHMAN,

Entomological Assistant, Bureau of Entomology.

Very few cases are on record of chalcids feeding as external parasites on hosts unprotected by the tissue of their food plant or food substance or by their cocoons or other protection of the pupa. A notable example of this is found in the eulophid genus *Euplectrus*, the life-history of one species of which, *E. comstockii* Howard, is well known in its relation to the cotton worm. We are now able to add another species to the chalcids having this habit, *Schizonotus sieboldi* Ratz., a species introduced from Europe. In connection with his original description of this species (Ichn. d. Forstins., III, 1852, p. 230), Ratzburg stated that it was reared by von Siebold from *Chrysomela populi*, and from the date of emergence judged that it must have been reared from full-grown larvae or pupae of the host.

¹ Published by permission of the Secretary of Agriculture.



On July 20 last I found a female of this species attacking a pupa of *Melasoma interruptum* Hald. on alder at North East, Pa. These pupae were very abundant, attached by the caudal end to the upper surface of the leaves. I captured the parasite and placed it with pupae of the beetle in a vial. It very shortly showed interest in the pupae and began its attack upon them. In ovipositing it inserted the tip of the abdomen between the pupal legs and wings. The exposed pupae were not again examined until five days later when all nine were found to be parasitized. Some of the parasites were in the larval and some in the pupal stage, some of the latter being already black. It is evident that some at least, and probably all, of the host pupae had already been parasitized when placed in the vial. But two, one bearing larvae and one pupae, had been parasitized for the second time and the minute larvae were feeding on the older parasites. These younger larvae were probably the offspring of the adult captured. Both larvae and pupae of the parasites were on the venter of the host and protected by the wing pads and legs. There were from 3 to 7 parasites per host. Usually one larva was attached to each of the wing pads and the rest to the venter of the host. (See Plate XIV.) When the larvae had finished feeding, the host pupa was sucked dry, but retained nearly its natural form. The pupae of the parasite were attached by their caudal end to the under side of the host remains.

At attempt was made to get the female parasite originally captured to attack pupae of *Melasoma tremulæ*, but she paid no attention whatever to them. There seems to be no reason why the species should not attack *tremulæ* since according to Ratzeburg, mentioned above, it was first reared from the closely allied *M. populi*. Its failure in this case to attack *tremulæ* may have been due to age as the parasite died two days after the introduction of the *tremulæ* pupae.

On the 30th day of July the parasitism was so great that among fifty or more pupae of the host species examined, I found only three unparasitized.

EXPLANATION OF PLATE XIV.

Schizodonotus sieboldi Ratz. Larvae and pupae in situ beneath pupae of the host, *Melasoma interruptum* Hald.

TWO NEW HYDROPHILID BEETLES.

BY E. A. SCHWARZ AND H. S. BARBER.

A species of the Hydrophilid genus *Epimetopus* Lac. 1854 (*Ceratoderus* Muls. 1851 non Westw. 1841; *Sepidulum* Lec. 1874) found in Arizona has been mentioned by the senior writer in his

introductory remarks to Dr. Boving's paper on *Hydroscapha* and requires characterization in order to enable us to distribute duplicate specimen to the workers in Hydrophilidae. Since Dr. Sharp 1874 has pointed out the close affinity of *Epimetopus* with *Spercheus* we take this opportunity to append a description of an apparently new species of the latter genus from the Philippines.

Epimetopus thermarum n. sp.

Similar to *E. costatum* Lec. but larger, piceous, except the legs and apical half of elytra which are refescant, more coarsely tuberculate and with the eye completely divided by the canthus. Length 2.2 to 2.8 mm. width 1.2 to 1.6 mm.

Habitat: Arizona.

Front coarsely tuberculate, opaque; labrum smooth, shining, feebly emarginate; canthus apparently completely dividing the eye, its upper and lower edges tuberculate and separated by shallow sulcus. Antennae 9-jointed, with loosely connected 3-jointed club; scape as long as the rest of the antennae, bent inward and thickened apically; second joint subglobular and nearly as wide as apex of the scape; third to sixth inclusive hardly half as wide as, and together not longer than the second; first joint of club about same size as second joint of antenna, second twice as wide but not longer, last joint a little wider and three times as long as first. Last joint of maxillary palpi as long as club of antennae. Pro-notum slightly wider than long, sides strongly angulate at middle, front margin produced over head, surface coarsely tuberculate with a pair of longitudinal costae uniting at basal fifth and apical tenth inclosing a lance-shaped median impression, and an outer pair of sinuate costae at lateral fourth. Elytra each with sutural, marginal, and four intermediate carinae, the second of the latter being interrupted at basal fourth, the third joining the humerus and the fourth obsolete except a trace behind middle and a prominent elongate tubercle at basal third. Inter-costal areas each with two series of large round almost perforate punctures, and three series of tubercles. Tarsi 5-jointed, tibiae octagonal, the carinae with setigerous serrations.

Sexes similar in all external characters.

Type and paratypes—U. S. N. M. No. 21,052.

Described from a large series (90 specimens) collected by the writers June 24-26, 1901, in the algal accumulations at the margins of the warm stream (about 100° F.) flowing from the Castle Creek Hot Springs, Yavapai Co., Arizona. A single specimen was also taken at the same place by the writers, December 27, 1913, being the only one observed during a diligent search at that season.

At the time of our first discovery of this species the hot stream

was nearly in its original state so that the margins were lined with a considerable accumulation of dead reeds matted together with a very wet algal growth, among which this beetle, with occasional specimens of *Hydroscapha*, was slowly crawling about. Larvae, apparently of *Epimetopus*, were also collected but were lost in the fire a few days later at Williams, Arizona, which unfortunately destroyed the bulk of our alcoholic material from the Hot Springs. The specimens now before us were all preserved dry and in the washing and remounting operations, most of the females have lost their egg-sacks (cf. Sharp, 1874, p. 248) so that we have almost no biological material and this (the egg-sack) is to be described in a work on Hydrophilid biologies by Mr. E. A. Richmond.

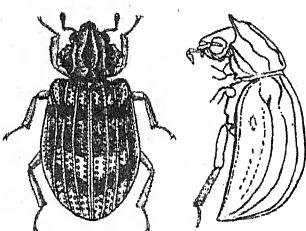


FIG. 1.



FIG. 2.

In regard to the mode of life of our only previously known species of this genus which as far as we know comes from a single locality, viz., Bose Co., Texas. The senior writer remembers having seen a letter from Theo. Belfrage to Dr. John L. LeConte in which he states that the species occurs not infrequently at the swampy margin of rivers, in company with the usual riparian coleopterous fauna such as *Tachys*, *Tachysa*, *Stenus*, *Bledius*, *Heterocerus*, etc. We know of no specimens except those collected by Belfrage, but Dr. Sharp 1882 records it from two localities in Guatemala.

Of the seven species now comprising the genus four are American and three are Asiatic, but only the two United States species have been seen by us; four of the other five species appear to be described from unique examples. In contrasting their descriptions the following table of species was drawn up, the most salient differences being taken from the characters there stated, and their comparative value in this table may not be trustworthy. The three Asiatic species appear to be not congeneric with the American forms, apparently having a different type of pronotal lobe and more pronounced elytral tubercles with metallic luster.

TABLE OF SPECIES OF *Epimetopus*:

- a. Eyes completely divided by the canthus
 - b. Color piceous, legs and apical half of elytra rufescent 2.2-2.8 mm.
(Arizona).....*thermarum* S. & B.
 - bb. Color ashy red, 3 mm. (South America or possibly Mexico)
trogoides Sharp 1874.
- aa. Eyes only about half divided by the canthus
 - c. Tubercles not metallic, pronotal lobe simple (America)
 - d. Color fuscus, elytra paler behind, legs ferruginous 2.3 mm. (Columbia).....*graniger* Muls. 1851.
 - dd. Color entirely reddish brown, tubercles small and rounded 2 mm.
(Texas).....*costatus* Lec. 1874.
 - cc. Tubercles metallic, pronotal lobe with apical elevated area (Asiatic)
 - e. Black with green and purplish metallic reflections; head, pronotum and elytra strongly tuberculate; pronotal lobe emarginate anteriorly with umbilicate rounded tubercle 2.5-3.0 mm. (southern India).....*maindoni* Reg. 1903.
 - ee. Blackish, posteriorly reddish, small apical elevated area on pronotal lobe appearing like another lobe, clypeus metallic 3 $\frac{3}{4}$ mm. (India).....*bullatus* Sharp 1874.
 - eee. Sordid yellow, head and breast black, pronotum fuscous; pronotal lobe with peculiar median marginate elevation near apex 3 mm. (Ceylon).....*flavidulus* Sharp 1890.

The literature on *Epimetopus*, as far as known to us, is as follows:

1851. Mulsant (Mém. de l'Acad. d. Sciences de Lyon, I, p. 1) describes *Ceratoderus* n. gen. for *C. graniger* n. sp. from the United States of Columbia.
1854. Lacordaire (Généra des Col., vol. I, p. 467), having seen no specimens of the genus, reproduces Mulsant's description but, being aware of the fact that the name *Ceratoderus* is preoccupied by Westwood, changes it to *Epimetopus*.
1874. Leconte (Trans. Amer. Ent. Soc., vol. 5, p. 47) erects the genus *Sepidulum* an anomalous member of the Hydrophilidae approaching the genus *Ochthebius*, for *costatum* n. sp. from Texas, collected by Belfrage.
1874. Sharp (Entom. Mo. Mag., vol. 11, pp. 247-250) discusses the characters of Leconte's genus *Sepidulum*, finding that the tarsi are 5-jointed and refers to the structure of the abdomen. He places the genus near *Spercheus* and describes *Sepidulum trogoides* n. sp. from "South America or possibly Mexico" and *Sepidulum bullatum* from India.
1882. Sharp (Biol. Centr.-Amer. Coleopt., vol. 1, pt. 2, p. 88, pl. 3, fig. 3) places *Sepidulum* as a synonym of Lacordaire's genus *Epi-*

metopus, figures the Texan *E. costatum* and records its occurrence at two localities in Guatemala. He remarks "the species of this genus are probably riparial rather than aquatic in their habits."

1883. LeConte & Horn (Class. Col. N. A., p. 71) recognize the synonymy of *Sepidulum* with *Epimetopus* and place the genus among the Helophorinae.

1890. Sharp (Trans. Ent. Soc., London, p. 355) describes *Epimetopus flavidulus* from Kandy, Ceylon (one specimen).

1903. Regimbart (Ann. Soc. Ent. Fr. LXXII, p. 338) describes *Epimetopus maindroni* n. sp. from the moat of the fortress of Gengi, southern India.

1908. Schwarz (Proc. Ent. Soc. Wash., vol. 9, p. 115) alludes to structures of the *Epimetopus* from Arizona.

1914. Schwarz (Proc. Ent. Soc. Wash., vol. 16, p. 165) lists *Epimetopus* nov. spec. among the species occurring in the middle course of the warm stream.

1916. d'Orchymont (Ann. Soc. Ent. Fr., vol. 85, pp. 101 and 105) proposes eight subfamilies of Palpicornia, the third and fifth being respectively the Spercheinae and Epimetopinae, the latter being suggested provisionally on adult characters since its larval stages are unknown.

***Spercheus stangli* n. sp.**

Shining, coarsely punctate with sparse short erect squamæ, piceous, the elytra variegated with fine irregular pale markings and each with three tubercles in addition to the humeral umbone. Length $3\frac{1}{2}$ mm.

Habitat: Philippine Islands.

Head with sparse squamiferous punctures, margin deflexed at middle and straight for one-third width of head, thence elevated into a marginal flange which extends obliquely backward and encroaches slightly onto the eye. Pronotum two and one-fourth times as wide as long, widest at apical third, front angles a little produced anteriorly, side margins arcuate to middle, thence straight to hind angles which are obtuse; base feebly sinuate close to hind angles and at lateral third; surface smooth, impunctate and highly polished basally, becoming coarsely punctate in the lateral depressions and on the pair of transverse anterior median callosities which are separated by a median impressed line obsolete in median third. Elytra about four-fifths as wide as long, widest at basal third, with side margins strongly expanded laterally, evenly rounded in basal half, thence straight and convergent to near apices which are strongly and not conjointly rounded; surface coarsely, closely, subseriately punctate, with a very pronounced pair of gibbosities near suture at apical fifth, another nearly as pronounced just behind middle and about halfway between suture and margin, and a less conspicuous pair at basal sixth and half way between the suture and the very prominent humeral gibbosity. Tibiae 6-carinate.

Type and paratype U. S. N. M. No. 21,053.

Described from two specimens received in 1901 from P. L. Stangl which are labelled Bay, Laguna Province, Philippine Islands. In the type the humeral umbone is produced posteriorly into a carina for a third the length of the elytra and the outline of the head is slightly different but these are believed to be variational or sexual differences. When received both examples were covered with a thin opaque grayish encrustation which entirely obscured the surface sculpture, exposing only a few of the club-shaped setae on the margins and on the tubercles. With the aid of a fine needle it was possible to scale off this encrustation from one side of one specimen; the setae being fast in the encrustation were naturally removed with it.

Fourteen species are now recognized in the genus only two of which are before us. From the literature at hand the twenty-two specific names proposed in this genus may be listed as follows:

LIST OF SPECIES OF *Spercheus*.

<i>algoensis</i> Peringuey 1892.....	South Africa
<i>australis</i> Peringuey 1892.....	South Africa
<i>capicola</i> Peringuey 1892.....	South Africa
<i>cerisyi</i> Guérin Ménéville 1835.....	Egypt
<i>cerysii</i> Lacordaire 1854	
(<i>costatus</i> Casteñau 1840) = <i>senegalensis</i>	
<i>crenulatus</i> Fairmaire 1893, Kolbe 1897.....	East Africa
<i>crenaticollis</i> Regimbart 1906.....	East Africa
<i>distinguendus</i> Fairmaire 1893 and 1903) = <i>senegalensis</i>	
<i>emarginatus</i> Auctorum.....	Europe
<i>luridus</i> Mathieu 1858	
<i>sordidus</i> Marsham 1802	
<i>verrucosus</i> Marsham 1802	
<i>hovanus</i> Fairmaire 1903.....	Madagascar
<i>humeralis</i> Regimbart 1906.....	East Africa
<i>interruptus</i> Fairmaire 1892.....	East Africa
(<i>luridus</i> Mathieu 1858) = <i>emarginatus</i>	
<i>mulsanti</i> Perrroud 1864.....	New Caledonia
<i>priscus</i> Sharp 1875, Fauvel 1883.....	Queensland
<i>platycephalus</i> MacLeay 1825, Castelnau 1840, Lacordaire 1854.....	Java
(<i>priscus</i> Sharp 1875) = <i>mulsanti</i>	
<i>senegalensis</i> Laporte 1832, Guérin-Ménéville 1835, Castelnau 1840, Lacordaire 1854, Fairmaire 1893, 1903.....	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1;"> <p>Senegal Dahomey Angola Madagascar Zanzibar</p> </div> <div style="font-size: 2em; margin-right: 10px;">{</div> </div>
<i>sulcatus</i> Gory in Guérin-Ménéville 1835.	
<i>costatus</i> Castelnau 1840.	

distinguendus Fairmaire 1893, 1903.
 (*sordidus* Marshal 1802) = *emarginatus*.
stangli Schwarz & Barber 1918.....Luzon
 (*sulcatus* Gory in Guerin-Meneville 1835) = *senegalensis*.
tesselatus Ziegler 1844, Lacordaire 1854.....Eastern U. S.
 (genotype of *Sperchopsis* LeConte 1861 transferred to *Hydrobius*, Horn
 1873, 1890).
verrucosus Marsham 1802) = *emarginatus*.

A NEW COLEOPHORA INJURIOUS TO APPLE IN CALIFORNIA.¹

(Lepidoptera; Coleophoridae.)

BY CARL HEINRICH,

Specialist in Forest Lepidoptera, U. S. Bureau of Entomology.

Coleophora volckeii n. sp.

Palpi iridescent ochreous on outer sides, silver white around base of second joint and on entire inner side, long slender; third joint two-thirds as long as second; a rather prominent tuft on joint two. Antennae silver white below, white above faintly banded with golden ochreous; basal joint tufted above with ochreous scales. Tongue white at base shading to ochreous. Face, head, and thorax iridescent ochreous. Forewings uniform iridescent ochreous. Hind wings a trifle more grayish; cilia of fore and hind wings concolorous, grayish ochreous, somewhat more yellowish at base. Legs silver white streaked with blackish ochreous on the outsides. Abdomen white below, ochreous above; anal tuft ochreous with a few white scales interspersed. Alar expanse 15 mm.

Habitat.—Watsonville, Cal.

Food Plant.—Apple.^o

Type.—Cat. No. 21464 U. S. Nat. Museum.

Described from five moths reared June 7-11, 1916, at the Bureau of Entomology from larvae collected by Mr. W. D. Volcke, who states that the species is injurious to apple in California, mining the leaves and occasionally feeding upon the fruit itself. Superficially the species resembles the eastern apple feeder, *C. fletcherella* Fern., but is readily distinguished by its larger size, the white markings on palpi, legs, and abdomen and its very different larval case.

¹ Due to the unexpected delay in the publication of this article this species was described in an article on its biology by W. D. Volcke, Mo. Bull. Calif. Comm. Hort., vol. 7, 1917, p. 463-467.

The case is of the *leucochrysella* type, 7 to 9 mm. long x 3 to 5 mm. wide at the widest part, with posterior end hook like and flatly compressed; mouth deflected to 90 degrees.

Full grown larva about 7 mm. long; uniform dark brown; head darker brown, more heavily chitinized areas black; pro- and mesothoracic shields black, divided; anal shield, crochets of abdominal prolegs, prespiracular plate of prothorax, tubercle III of meso- and metathorax, chitinous plate above anal prolegs and more strongly chitinized parts of legs jet black.

This species is named in honor of the collector Mr. W. D. Voleke.

THREE HUNDRED AND THIRD MEETING.

The 303rd regular meeting of the Society was entertained by the Hymenopterist members at the Saengerbund Hall, April 5, 1917. There were present Messrs. Barber, Cole, Cushman, Dietz, Ely, Gahan, Greene, Howard, Kotinsky, Middleton, Pierce, Rohwer, Sanford, Sascer, Schwarz, Shannon, Spear, and Viereck, members, and Messrs. Dr. J. Chester Bradley, R. M. Foutz, Ira N. Gabrielson, A. C. Johnson, and M. A. Murray, visitors.

The secretary announced that the Executive Committee had acted favorably upon the name of Mr. H. S. McConnell of Maryland State College for corresponding member and on motion the secretary was instructed to cast the ballot of the Society in his favor.

Under the head of proposals of new members, the following names were proposed for corresponding members: Mr. Shirley L. Mason of the U. S. Entomological Laboratory, West Lafayette, Ind., by Mr. Greene; Dr. H. T. Fernald of Amherst, Mass., by Mr. Rohwer; and Mr. Max Kislick of Ohio State university by Mr. Gahan.

Under the head of program the following papers were presented: The Relation of Natural Conditions in the Cotton Belt to Insect Distribution and Behavior, by W. D. Pierce.¹

"Some Notes on the Classification of Cerambycid Larvae," by F. C. Craighead.

A. B. GAHAN.

¹ Withdrawn from publication.

A NOTE ON THE TORTRICID GENITALIA.

BY CARL HEINRICH,

Specialist in Forest Lepidoptera, U. S. Bureau of Entomology.

In his "Hand-book of the British Lepidoptera" (1895), Meyrick separates the two Tortricid families *Epiblemidae* (*Olethreutidae*), and *Tortricidae* by the presence or absence of hair on the lower median veins of the hind wings, and by the development or non-development of the uncus of the male genitalia, characterizing the two families as follows:

Epiblemidae; lower median vein of hind wing hairy towards base; *uncus not developed*.

Tortricidae; lower median vein of hind wing not hairy towards base (except *Sparganothis*); *uncus developed*.

In as much as the basal pectin on the hind wings is found in several Tortricid genera (*Sparganothis*, *Amorbia*, *Synoma*) as well as in the *Olethreutidae* (*Epiblemidae*), such a striking difference as the presence or absence of a developed uncus, if constant, would be a valuable character for defining the limits of the two families which all authorities accept as natural groups. In his later works, however ("Revision of Australian Tortricina," 1910-1911, and "Genera Insectorum, Tortricidae," 1913), Meyrick makes no mention of genitalia and as far as I know no one else has criticized his original statement.

In an effort to find some adult characters to match with certain structural differences in the larvae I have had occasion of late to examine the male genitalia of a number of Olethreutids and found to my surprise that a well developed uncus was quite a common occurrence in that family. Six geno-types (*Olethreutes arcuella*, *Ancylis laetana*, *Enharmonia woebiana*, *Proteopteryx emarginana*, *Bactra lanceolana*, *Eucosma similana*, (type of the Hubner's *Epinotia*) and *Rhopobota naevana* all show the part prominently developed. It is absent or rudimentary in a majority of the species now listed under *Eucosma*. In *E. raganoti* Wlsm., *fænella* L. and *invicta* Wlsm. it is merely a rounded hairy prominence at the end of the integument.

In *E. biluniana* Haworth, *E. castaneana* Wlsm., and *E. agricolana* Wlsm. it is short and bifurcated, while in *stigiana* Dyar and *vestaliiana* Zell. it is long, bifid, and heavily chitinized. In several species of the genus *Olethreutes* it is quite prominent, taking various fantastic shapes. *Proteopteryx emarginana* Wlsm. has a long narrowly spatulate uncus, while *bolliana* Slingerland, listed under this genus, has none, and *P. deludana* Clem. has the uncus long and bifid with the extremities well spread apart. On the other hand the uncus is much less prominent on *Tortrix viridana*

L. (the type species of the Tortricidae) than on many true Olethreutids.

It can readily be seen therefore, that the presence or absence of this part means nothing as far as family or sub-family distinctions in the *Tortricoidæ* are concerned. At best it is a generic difference and under the present accepted classification not even that.

There is, however, a rather striking difference between the genitalia of the Tortricids and Olethreutids in the structure and development of the harpes. In the *Olethreutidae* (except in a few species where the costal margin is free to the base thus forming double harps) the harps are strongly chitinized, emarginate, with sacculus not extended into a free arm but fused with the costa, leaving a more or less restricted opening at the base, the costal edge projecting in the form of a short hook; usually a well defined anal angle, cucullus and corona; transtilla absent.¹

In the *Tortricidae* the harpes are shorter in proportion to the whole genitalia usually rather weakly chitinized; widest at base: tapering or squared; without pronounced anal angle, or well defined cucullus or corona; sacculus narrow and not fusing with costa: transtilla normally present and developed.

From the *Glyptopterygidae* which they equal in all other genitalic characters, the *Tortricidae* may be distinguished by the articulation of the aedeagus: In *Tortricidae* it articulates on an arm (or forked projection) from the plate of the Juxta. In *Glyptopterygidae* it passes through an opening in the plate.

As a means of specific identification among the Olethreutids, particularly between American and European species which are apt to be confused, the male genitalia are of immense value. Between closely related species the differences in structure are often marked. Consistent generic characters are more difficult to discover. At first glance this seems hopeless in the *Tortricoidæ*. It is very probable, however, that even here we may find good characters for generic differentiation if proper allowance is made for the wide range of specific modifications and if such characters as hold constant for several species are checked against the more diagnostic setal and venational character of the larva and adult.

Alone and unsupported they would not be a safe guide for the classification of genera.

¹The terminology of the parts is adopted from F. N. Pierce, "Genitalia of the British Noctuidæ" (1909), and "Genitalia of the British Geometridæ" (1914).

THE AMERICAN SPECIES OF THE GENUS CEPHUS LATREILLE.

BY S. A. ROHWER,

Forest Insects, Bureau of Entomology, Washington, D. C.

This paper, which is a contribution from the Branch of Forest Insects, Bureau of Entomology, is the result of a careful study of a large series of specimens of *Cephus* reared from the stems of various grass-like plants and is an attempt to separate the species which are injurious to American Cereal and Forage crops. For a number of years the writer had been of the opinion that there were a number of distinct forms responsible for the damage done to cereal and forage crops in the west, but a critical examination of a large series from the same locality and host has proven that the forms previously distinguished are only extreme variants of the same species and that there are all the necessary intermediates to show that there is only one species involved.

The introduced, European, *Cephus pygmaeus* (Linnaeus) is very similar to the native species common throughout the west and it is difficult to find characters which distinguish the two in all their forms. The characters offered in the following key are, however, reliable for the material available.

KEY TO THE NORTH AMERICAN SPECIES OF CEPHUS.

Stigma and costa dark brown of a uniform color; mesepisternum black; femora black; apical tergite and venter black; face and scutellum black (face of male with yellow spots).....*pygmaeus* Linnaeus
Stigma in greater part and costa yellow; mesepisternum with the upper angle yellow; apical tergite and usually the venter in part yellow; femora usually mostly yellow; face and scutellum of female usually black but occasionally with yellow spots.....*cinctus* Norton

Cephus cinctus Norton.

Cephus cinctus Norton, Tran. Amer. Ent. Soc., vol. 4, 1876, p. 86.

Cephus occidentalis Riley and Marlatt, Insect Life, vol. 4, 1891, p. 177.

Cephus graenicheri Ashmead, Can. Ent., vol. 30, 1898, p. 182.

The above listed synonymy was first pointed out by Konow in his *Chalastogastra*, p. 265 (published in *Zeit. Hym. Dipt.*, 1905, p. 249). The species *cinctus* is subject to considerable variation in color and structure. The variation in structure consists of the variation in the relative lengths of the postocellar line as compared with the ocellocular line. The postocellar line varies from distinctly shorter (as high as a ratio of 5 to 7) than the ocellocular line, to subequal with it, to longer (as high as a ratio of 7 to 5.5) than the ocellocular line. In a series of twenty-

one measurements of females reared from stems of *Elymus condensatus* collected at the same place and same time, thirteen had the postocellar line shorter than the ocellocular line, five had the two lines subequal, and three had the postocellar line longer than the ocellocular line. And in this series of measurements there was all degrees of differences so in some cases the smallest fraction of a millimeter would have placed the individual in the other series. The other structural variation consists in the extent of the depression in front of the anterior ocellus, in the smaller individuals it is very restricted while in some of the larger ones it extends to the position the middle foeva would occupy.

The range of variation in color is great but all of the extremes and necessary intermediates were found in the series from *Elymus condensatus*. The face in the female may be mostly yellow but normally it is black. The scutellum may be mostly yellow, or with two spots, but in most specimens it is black. The venter is usually marked with yellow but in a few specimens it was entirely black. The femora are usually mostly yellow but in some of the specimens (usually smaller individuals) they are almost entirely black and there is every degree of variation between. The wings vary from hyaline to distinctly infuscated. The antennae are usually 20 jointed, but in some specimens there were only 18 joints. The banding of the tergites is extremely variable.

Specimens reared from the stems of the following have been examined: *Elymus* sp.; *Elymus condensatus*; *Elymus canadensis*; *Agropyron smithii*; *Phleum pratense*; and wheat.

Specimens from California, Utah, Colorado, Montana, Wisconsin, and Manitoba. This species has a more extended range but inasmuch as it will be treated in an economic paper where its distribution will be discussed a full account of the distribution is omitted from this paper and the above discussion is based on specimens from the states listed above.

Type of *cinctus* Acad. Nat. Sc. Phil.; type of *occidentalis* Cat. No. 20175 U. S. N. M.; type of *graenicheri* Cat. No. 6842 U. S. N. M.

Cephus pygmaeus (Linnaeus).

This species has been treated in considerable detail in economic papers and need not be discussed here. Specimens have been examined from the following localities: Europe (many localities), Ithaca, N. Y. and Ottawa, Canada. As far as the American material is available it would seem that this species has not spread widely nor has it been of much economic importance in recent years.

(Cephus) *Janus rufiventris* (Cresson).

Konow leaves this species in *Cephus*, but Dr. J. C. Bradley who has examined the type, which is Cat. No. 534 Acad. Nat. Sc. Phil., has kindly permitted the writer to state that the species belongs to the genus *Janus*.

**A PECULIAR HABIT OF A HORSEFLY (TABANUS AMERICANUS)
IN THE FLORIDA EVERGLADES.**

By THOMAS E. SNYDER.

On March 25 to 29, 1917, I visited Mr. C. A. Mosier's camp (plate XV, fig. 1) in Royal Palm Hammock, about 48 miles southwest of Miami, Dade County, Florida, to collect termites. On March 26, at about 4.45 a.m. (central time) a peculiar buzzing was heard, which increased in volume until it became a dull roar. Mr. Mosier stated that this was caused by a large horsefly (specimens were identified by Mr. C. T. Greene, as *Tabanus americanus*) and that this buzzing had been going on for 10 days to 2 weeks at about the same hour in the morning, but that it was at its height about 1 week ago and was now waning. The adults were flying in countless thousands. Mr. Mosier did not notice this habit last year and my observations indicated that this species was not especially common last year either at Royal Palm Hammock (Paradise Key) or Miami.¹

Observations were made on the flight each morning. The flies took to the wing at the "peep of day" when the birds commence to sing and a few of the stars are still visible. The buzzing commences gradually but increases very rapidly in volume to a dull roar. The whole flight lasts only about 20 minutes and is at its height for about 15 minutes gradually increasing and subsiding. At sunrise on March 26 about 5.20 the buzzing had been over for some time, the last adults flying at 5.05 and the flies had quieted down and only flew when disturbed. During the flight the gradually increasing buzzing attracts other flies till all are on the wing: the flies can be heard as they leave the tree trunks, where they have been resting and striking the foliage with their wings, as they rise up through the trees. They fly above the tree tops and can be observed all over the hammock, the buzzing is loudest in the main hammock, which is the largest in area.

Individuals hover in the air in one spot in openings in the forest canopy (where the tree crowns don't overlap) and over the

¹ Snyder, T. E. "Horseflies as a Pest in Southern Florida." Proc. Ent. Soc. Wash., Vol. XVIII, No. 4, December, 1916 (June 11, 1917), pp. 208-210.

road; this habit resembles that of the flower flies (*Syrphidae*). Occasionally the flies dart towards one another after hovering, and *rarely* two can be observed clinging together, and after a short period rapidly dart away. Mr. Mosier's opinion is that this is a mating flight. Birds do not disturb the flies, possibly being alarmed by the noise.

On March 27, observations were again made and conditions during the flight were similar. During the night of the 27th, it was noted that there was no flight, observations being made at 12.10 and 3.15 a.m. At 1.20 a.m. on March 28 no adults were flying. At 4.09 a.m. I arose, went into the hammock in the dark and carefully noted the exact time when the flight began; this was at 4.44 a.m. and was at its height for 15 minutes and then waned and ended at 5.03. There was quite a little low-lying fog on the morning of the 28th. The buzzing appeared to be not as loud as on the 27th.

On the morning of the 28th, at about 10.30, a heavy thunder shower came up and there were showers until late in the afternoon. I was in a hammock at Long Key about 5 miles northwest of Royal Palm Hammock, during the rain and noticed that afterwards the flies were especially persistent in attempting to jab one. At Royal Palm Hammock on our return when Mr. Mosier and I were changing our wet clothes in an open shed they were several times successful.

The morning of the 28th was damp and chilly and the flight began a little later and was not as strong; the flight began at 4.46 and adults were flying until 5.04; hence the flight was of slightly shorter duration. During the day of the 29th, which was partly cloudy, adults of this Tabanid were very annoying* in the hammock. They congregated about our tent, in a shed, and swarmed about moving vehicles along the road. Mules were clothed in closely fitting but not tight gunny sacking for protection—only a partial protection! On the morning of the 29th a male of *Tabanus americanus* was found among leaf mold on the forest floor. Males in this species and other Tabanidae are rare.

In general, during the day time this horsefly is the common species along roads and in the hammocks; in the latter locality it rests on the tree trunks and only flies when disturbed or when quarry comes along. These large Tabanids are very annoying while collecting in the hammocks; the bite or prod feels like a red hot needle. Mosquitoes and deer flies (*Chrysops* spp.) make a veil and gloves necessary, especially if one stands in one place for any length of time.¹ Heavy flannel army shirts, khaki riding

¹ The Seminole Indians have descriptive names for horseflies and mosquitoes; these insects doubtless are very annoying to the Indians; O-he-haw is mosquito and Chil-lock-o-do-no means horsefly.

breeches and a cap were penetrated. One is attacked through clothes especially where they are stretched tightly.

At Hobe Sound, Florida, the protective cloth covering of the mules gave them a grotesque appearance which reminded one of the head coverings of the mounts of the Klu-Klux Klan, there being holes for the eyes but even the ears were covered.

Tabanus americanus occurs at Royal Palm Hammock and in Hammocks on Palma Vista and on Long Key. None were noted on Adam Key, an offshore key 27 miles south of Miami; a smaller species was collected there. This species was occasionally seen last year at Miami but none have been seen this year either at Miami or in the mangrove swamps at Miami Beach. In the pineland at Palma Vista and Long Key where the ground consists of an eroded dirty greyish white oölitic limestone, the flies were also abundant. This stone is more exposed in the pinelands where areas have been burned over. In hammocks in this area this rock is covered over (but not filled) with vegetation or humus and leaf mold. Deep holes, i.e., "lime sinks" occur in this formation, which are now dry.

DESCRIPTION OF ROYAL PALM HAMMOCK.

Dr. J. K. Small, of the New York Botanical Garden, has explored this region botanically and described conditions at Royal Palm Hammock in an illustrated article in the Journal New York Botanical Gardens, 17, pp. 165-172, October 1916. Small states that the headwaters of the Taylor river separate the Everglade Keys, in extreme southeastern peninsular Florida, into two natural divisions, the Biscayne pineland and the Long Key pineland. Among the forks and sloughs of this river are many "Keys"¹ or islands clothed with "hammock" vegetation (a hammock is dense growth mostly of broad-leaved trees and shrubs, giving shade in a pineland or sawgrass "prairie"). Royal Palm Hammock is the largest of these. It stands out prominently in the landscape and may be seen for a long distance (10 miles) across the prairie. Many of the royal palms tower above the other hammock trees. (Plate XV, fig. 2.)

Royal Palm Hammock lies a little south of the main axis of the Everglade Keys, 14 miles southwest of Homestead. The unfinished Ingraham highway (plate XVI, figs. 1 and 2.) connecting Miami and Cape Sable, Florida, runs through this hammock. In building this road, rock was dredged from the side of the road leaving ditches which contain fresh water. Catfish, perch, "gar" and "brim" live in these ditches.

The Everglades and the hammocks are dry at this time of the year (1917); Mr. Mosier states that an unusually heavy rainfall

¹ The term key largely replaces the word island in southern Florida and is applied to islands near the coast and also to islands in the Everglades.

occurred on March 4, 5, 6, and 7, 1917 (about 7 inches), and that this was a month early for the spring rains. The "prairie" is the higher portion of the sawgrass "Everglades;" the "slough" the lower portion, where the water drains off during the wet season. The bottom of the slough is now dry but is matted down with thinly caked mud; the sawgrass grows over this to a height of 2 to 3 feet at this season. This area of prairie and slough is under water from 3 to 8 months of the year, according as to whether the season is wet or dry.

Mr. Mosier states that in 1916, the prairie was covered with water in August, October, and February, 1917. The source of the Taylor river at the east end of the hammock is covered with pads of the yellow water lily; pickerel weed also grows in the water. There is no current when the slough is dry, as now.

The trees of Royal Palm Hammock, aside from the royal palms are mostly sub-tropical species, including live oak (plate XV, fig. 1), sweet bay magnolia, cocoa plum, pigeon plum, wild tamarind, West Indian cherry, gumbo limbo, strangling fig (*Ficus aurea*), sabal and saw palmetto. Spanish moss (plate XV, fig. 1), epiphytic growth, ferns and vines cover these trees. Especially striking is the long grey Spanish moss and the sleeping or resurrection fern. This fern (*Polypodium polypoides*) lives on the upper side of tree limbs and is dry and a dirty brown till there is rain fall, then it becomes a beautiful green mass.

There is a dense tangle of undergrowth; a variety of ferns grow luxuriantly, especially large beds of the Boston and royal (*Dryopteris* and *Drypetes*). The forest floor is rich in black humus and is covered with a coarser leaf mold. Before the heavy rain on the 28th the humus and leaf mold was very dry but afterwards it became very damp.

Mr. Mosier is responsible for all the plant names.

It is warm in the hammocks in spite of the dense shade, since there is but little air in circulation, owing to the dense jungle of hanging vines and undergrowth.

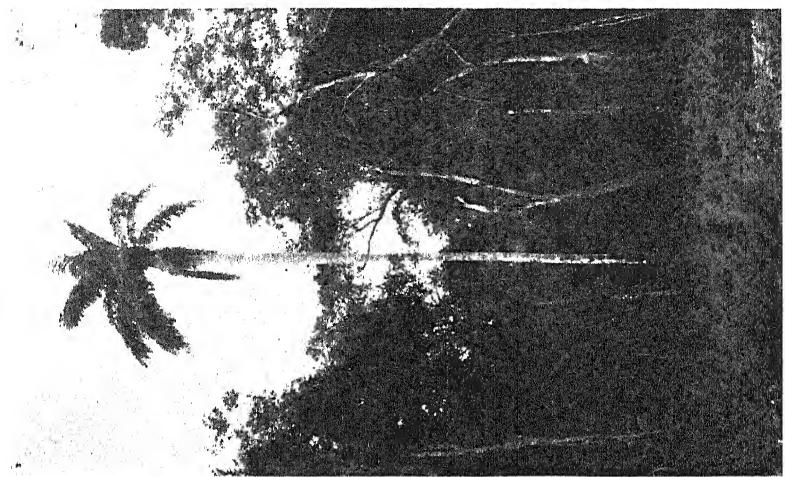
It is interesting to note in connection with abundance of this large Tabanid and other horseflies, that Anthrax of horses and cattle does not occur in Dade County, Florida, according to several reports.

Dr. Small refers to the animal life of the Everglades in his paper. C. T. Simpson¹ and Mrs. W. S. Jennings² have described conditions at Paradise Key.

The accompanying photographs were made by E. C. Loveland of Homestead and W. E. Brown of Miami, Florida.

¹ Simpson, C. T. "Paradise Key." The Tropic Magazine, Vol. IV, No. 1, pp. 1-9, April, 1916. (Illustrated.)

² Jennings, W. S. "Royal Palm State Park." (Lists trees on the hammock.) Ibid., pp. 10-16 and 26.





APPENDIX TO A PECULIAR HABIT OF A HORSE FLY (*Tabanus americanus*)
IN THE FLORIDA EVERGLADES.

March 30.—Dawn fair, flight not so strong, but lasted until sunrise.

March 31.—Dawn fair, flight stronger than on 30th.

April 1 to 7.—Flight continued normal; noticed a few of another species of Tabanid.

April 8 to 9.—Absent from park, no observations.

April 10 to 14.—Noticeable diminution of volume of flight. Observed many of the flies during day especially during early morning hours feeding on flowers, counted from 5 to 34 on various small sweet bay trees, also on coco plum, myrtle and salt bush, which are in bloom.

April 15 to 22.—Feel sure that these flies feed on flowering plants in absence of animal life, have been standing beside road where most flowering plants are and observing them leave the plants for mules and negroes as teams pass. Have observed closely and think they are feeding on nectar rather than pollen. Veranda screens trap them by the thousands, have left screen down open late evenings and early mornings they dart about striking the screens until they drop exhausted, we have to sweep the veranda floors every day to get rid of them.

This other species is far more numerous than *T. americanus*.

April 23 to June 30.—Other Tabanid abundant, no flight of this insect as in case of *T. americanus*; only scattering specimens of *T. americanus* appearing now.

July 14.—First appearance of brown Tabanid.

July 15 to August 23.—Only occasionally the other Tabanid and brown Tabanid not as common as former years.

Unable to observe any Tabanids depositing eggs or mating. Have found few large Dipterous exuviae in leaf mould while picking up palm seed: believe these to be Tabanid exuviae but am not certain.

March 30 to August 23, 1917. Royal Palm Hammock, Paradise Key, Dade County, Florida, C. A. Mosier.

* PLATE XV.

Fig. 1. Site of C. A. Mosier's camp at Royal Palm Hammock.

Fig. 2. Royal palm tree overlapping other hammock trees.

PLATE XVI.

Fig. 1. Royal Palm Hammock seen from the prairie.

Fig. 2. Royal Palm Hammock, Ingraham Highway, near Mosier's camp. *Tabanus americanus* was abundant hovering over this road at 4.45 to 5.05 a.m. only.

THREE HUNDRED AND FOURTH MEETING, MAY 3, 1917.

The 304th regular meeting of the Society was entertained by the Society members from the Federal Horticultural Board at the Saengerbund Hall, May 3, 1917. There were present Messrs. Abbott, Baker, Barber, Böving, Busek, Cushman, Dietz, Ely, Fisher, Gahan, Carman, Greene, Kotinsky, Middleton, Morrison, Paine, Rohwer, Sanford, Sasseer, Schwarz and Wood, members, and R. M. Fouts and Edwin P. Selkregg, visitors.

Mr. Shirley L. Mason, of the U. S. Entomological Laboratory, West Lafayette, Indiana, Dr. Henry T. Fernald of Amherst, Massachusetts and Mr. Max Kisliuk of Ohio State University, Columbus, Ohio were elected corresponding members. Under the head of program the following were presented:

THE USES OF INSECT GALLS.

BY MARGARET M. FAGAN.¹

A CONTRIBUTION TO THE BIOLOGY OF N. A. DIPTERA.

BY CHARLES T. GREENE,

Forest Insect Investigations, Bureau of Entomology.

The Diptera discussed in this paper was reared by the writer at the Eastern Field Station, Falls Church, Va. All the species discussed below remain in the larval stage during the winter. The larva of *Mydas clavatus* and *Dasyllis thoracica* are predaceous on Coleopterous larvae, therefore they are of importance. The larva of *Dasyllis* is a secondary wood-borer in addition to being predatory. All of the above species are known in the adult stage but their seasonal history and habits are entirely new.

Neopachygaster maculicornis Hine.

Ohio Naturalist, II, p. 228.

The larvae were collected at Falls Church, Va., November 29, 1912, by the author. They were found under the bark of Tulip (*Liriodendron*) in the sap, on the moist surface between the outer wood and bark. The exact time of pupation is not known but is sometime in early spring. The adults emerged between May 23 and June 3, 1913.

Larva (plate XVII, fig. 4).

Larva.—Grayish-brown, flattened and somewhat chitinous. The entire surface of the larva, except the head, is marked in a very minute way,

¹ Withdrawn for publication elsewhere.

resembling the scales of a snake skin. The dorsal and ventral bristles are yellowish-brown and the ventral bristles are located about like those on the dorsum.

Head: The head resembles a beak, much darker at the apex; along the entire vertical length of the dorsum of the head, is a broadly rounded ridge terminating into a sharp point.

On each side of the anal opening are three bristles, in a vertical row, and a single bristle, near the base of the segment which is located between this row and the lateral edge.

For general details see the drawing.

Pupa (fig. 4).

Pupation takes place in the larval skin and the pupa looks identical with the larva; the only difference is, the flexible skin along the segmental lines becomes rigid. The adult emerges by pushing off the head and splitting the first two segments down the middle of the dorsum.

Mydas clavatus Drury.

Illustrations of Nat. Hist., I, p. 103.

The larvae of this species were collected at Falls Church, Va. by Mr. T. E. Snyder and the author, in the rotten roots of a dead tulip stump. All the larvae were well below the ground, where the wood was quite moist; they resembled the wood fibres so closely that they might often be overlooked. The larvae are predaceous on Coleopterous larvae and one larva devoured an earth worm, placed in the breeding jar. In the same roots were several larvae of the following Coleopterous genera, *Alaus*, *Parandra* and *Pelagnota*.

Only one larva pupated, June 1, 1914 and the adult emerged June 27, 1914.

Larva (plate XVII, fig. 1).

The larva is 40 mm. long and little over 6 mm. wide, nearly cylindrical. Smooth, opaque, ivory white.

The beak is 1.5 to 2 mm. long, when extended, heavily chitinized and of a dark brown color. It is retractile into the first segment. The beak is split in the center of the apical half. On the dorsal side are three pairs of yellowish-brown, proclinate, bristles; the middle pair are the smaller and are sometimes divaricate and the posterior pair are the larger. Sides of the larva are parallel, tapering to a point from the third to the first segment.

The first segment has two faint longitudinal grooves near the middle and one near each lateral edge, on the dorsum and the venter. All the other segments have the lateral grooves which form the following ridge: on the sides of all the segments, and the entire length of each, is a broad

ridge, broadly rounded. This ridge is only on the basal half of the last segment, the sides of the apical half are broad at the base and terminate into a sharp edge or carina at the apex. At the base of the first segment, near the outer corners, are two small, yellowish brown spiracles, which are elliptical, chitinous plates with three, parallel, oblique slits which are darker on the edges and point towards the apical corners of the first segment.

Near the apex of the lateral ridge, is a microscopic spiracle on all segments except the first, second and last.

The last segment is nearly twice as long as the preceding ones and terminates into a blunt point. In the middle of the dorsum of the last segment are two transverse grooves or folds which are interconnected by two smaller folds, which are oblique and slightly curved. From these transverse grooves are two longitudinal, faint grooves which are irregular and terminate at the apex of the last segment.

The last segment has two much larger spiracles, located near each basal corner. Each spiracle is nearly circular and are much darker yellowish-brown than the anterior pair. Around the edge of each is a band or border composed of 40 compressed ringlets, resembling a cross-section of grains of corn. The area inside of this band is pale grayish brown. Below the upper edge, which is towards the cephalic end of the larva, is a crenulate opening reaching half way around this area. See plate xvii, fig. 3.

The under side of the head has two pairs of proclinate bristles, one pair at the base and the other at the middle.

Segments one, two and three each have one pair of yellowish-brown bristles on the ventral side. Each bristle is located in the middle of the segment and about one-fourth the transverse width from the lateral edge.

The ventral side of the last segment has a pair of yellowish-brown bristles near the apex and a pair on the lateral edge located at about the apical fourth. At the base of this segment is a groove which forms a rectangular surface with a slight depression near each end. From this rectangular surface are two grooves running parallel, half way to the apex, then converging to a point at the apex.

The anal opening is located at the base of this last mentioned surface.

Pupa (plate XVII, fig. 2).

The pupa is 25 mm. long and 6 mm. diameter at the base of the abdomen; thorax nearly 7 mm. diameter.

Head and thorax are dark reddish-brown. Abdomen much lighter and of a brick-red color. The whole pupa is rugose, the abdomen is more sharply marked, especially along the apical edge of the segments, where it is reticulate.

Head.—Near the apex are two large horn-like projections. Below are two more projections, each having one large and one small tooth or prong. In back of and slightly below each apical projection, is a bifid humeral spiracle, opening on the caudal side. The ends are bifurcate, shiny and

finely serrated on the edges. In general this spiracle resembles a "ram's horn." The wing-pads reach to about the middle of the second abdominal segment and the leg-sheaths slightly beyond the pads. Near the base of each wing-pad is a rugose tubercle, terminating into a chitinous, pointed tooth.

Abdomen.—Along the basal edge of the first segment is a row of large tooth-like, dark brown spines with the points turning backward. Each of the end spines are much smaller than the others. On the sides of the first segment, close to the apical edge, is a row of spines, reaching from the lateral edge of the dorsum to the wing-pads. All the other segments, except the last, have a transverse row of prominent spines near the apex encircling the segment, the spines on the dorsum are the larger. The last segment has two pairs of very small spines on the dorsum, near the base. On each side are three larger spines near the middle and transversely across the middle of the venter are four spines. This segment terminates into two very large horn-like spines. All the spines on the pupa are shiny, heavily chitinized and quite dark on the apical half, the basal portion is rugose and of the same color as the pupal skin.

On the side of all the segments, except the last, is a ridge which is broad and slightly rounded, extending the longitudinal length of each segment. Above and slightly in front of the center of each ridge, is a spiracle like the humeral one but lighter in color and opening on the cephalic side.

The adult emerges from the pupa through a longitudinal, dorsal slit in the thorax and the bursting of the sutures around the head.

Dasyllis thoracica Fabr.

Syst. Annl., p. 158.

This species is predaceous in the larval stage and a secondary wood-borer, in moist dead, Tulip stumps. It closely resembles a Coleopterous larva and is easily overlooked because it closely resembles the wood fibre, in which it lives. The larvae were collected at Falls Church, Va., April 10, 1914, by Mr. S. A. Rohwer and the writer.

They pupated April 21, 1914 and emerged May 11, 1914. Under natural conditions, the larva pupates in the gallery, and the pupa is fairly active.

Larva (*plate XVIII, fig. 1*).

Larva.—Opaque, white, elongate and cylindrical. The entire larva longitudinally striate. The greatest width of the larva is across the second segment; other segments nearly parallel. The larva is 27 mm. long and 5.5 mm. wide across the second segment, while the other segments are nearly 5 mm. wide.

The head is very heavily chitinized and black with the basal corners reddish. From a dorsal view the head is divided into three parts. The

basal part reaches the full width of the head; it is deeply concave on the apical edge, in the middle of which is a long, slender, tooth-like projection extending up between the two upper sections. Each of these sections are somewhat triangular in shape; the inner side terminates into a tooth-like projection at the apex and below this, on the outer edge, is a similar projection. The antennae are located near the basal outer edge of this last mentioned projection. The antennae have two cylindrical joints of nearly equal length, the first joint is reddish-brown at the base and yellowish at the apex, while the coloring of the second joint is the reverse. All the bristles of the head are pale yellow.

For details of head see drawing, figure 5 dorsal view and figure 4, ventral view.

First segment rather broad and rounded. At the apex is an elliptical area finely granulated, being much finer at the base. Just below this is a perfectly smooth, narrow, transverse band, not quite reaching the lateral edges. The second segment is about half the width of the first, along the apical edge is a narrow transverse space which is very finely rugose. The third segment is very narrow, being about half the width of the second segment. Near the apical edge are two rather sharp transverse wrinkles slightly depressed or flattened in the middle. Segments four to ten are about the same width. Segments four to nine, each have one pair of ampullae on the dorsum and two pairs on the ventral side. The last segment is deeply depressed on the basal half, faintly rugose and with two well defined longitudinal ridges on the lateral edge. Towards each outer edge is a large spiracle, dark yellowish-brown and rather heavily chitinized. For further details see figure 1. The apical half of this segment is raised much higher than the basal half, slightly rugose and terminates into a broad and narrow, reddish, chitinous plate, black on the outer edge, in the center of which is a prominent, black, tooth-like projection. This chitinous plate has a large, yellowish bristle extending from the under side near both of the outer corners. Near the middle of the last segment, on the elevated portion, are four large yellowish bristles, in a transverse row.

The details of the under side of the head can best be seen in the drawing, figure 4. All the dark portion is heavily chitinized and black, the dark area in the central, basal part is reddish on the apical edge. The bristles are yellowish.

On the apical edge of the ventral side of the first segment is a narrow crescent-shaped area finely granular. Segments one to nine each have a yellow bristle, near the middle and out near the lateral edge.

At the apex of the last segment, on the ventral side, near each outer basal corner is a yellow bristle. At the base of this segment are several, short, well marked ridges.

On the side of the first segment, near the base is a spiracle, nearly circular having three faint ridges on the cephalic side, just below these is an opening which is pit-like in appearance. It is dark brown, chitinous and faintly granular, located in a small depression in the larva. For details see drawing, figure a.

On the side of segments three to nine, and located at about the apical third, is a small, round, flattened spiracle, with one faint slit across the middle.

The PREPUPAL larva is white and of about the same size and appearance as the larva. There is a great shrinkage of the first segment and from a side view the dorsum of this segment is concave.

The humeral spiracle is formed slightly in front of and above the large anterior spiracle of the larva, and all the lateral, abdominal spiracles are formed in front of and below those of the larva. All the abdominal spines and bristles are pale yellow and perfectly formed under and show through the semi-transparent larval skin. The large pointed horn-like projections at the apex of the abdomen project slightly through the skin and are of the darkened, nearly normal coloring.

Pupa (plate XVIII, fig. 2).

The pupa is elongate, cylindrical, moderately shiny and faintly rugose. The general color is pale yellow ochre. It measures 20 mm. in length and 5 mm. in width at the thorax while the abdomen is slightly narrower.

Head.—On each side of the apex is a large, pointed, horn-like projection, below each of these, on the side, is a larger one with three large prongs, the last one having two small points at the apex.

These large projections are deep reddish-brown, very rugose at the base and smooth and shiny on the apical half. In back of the above projection is a small, sharp pointed, tooth-like projection, yellow at the base and reddish-brown at apex; near the middle of the upper side is a small ridge reaching to the apex.

Thorax.—Near the base of the first abdominal segment, across the middle of the next four segments and at the apex of the last segment, yellowish brown.

The humeral spiracle is small, reniform, pale yellow, smooth and slightly raised, with a row of uniform dark dots around the curved edge. (See drawing, plate XVIII, fig. b.) On the upper edge of the wing-pad is a rounded, raised surface, with a small, narrow, darkened, sharp edge just back of the center. At the lower edge of the pleura and touching the wing-pad is a foot-like projection, which is reddish-brown towards the apex where there are two small, tooth-like points and one large point near the base.

The wing-pads reach to the middle of the second abdominal segment and the leg-sheaths to the middle of the third segment.

Abdomen.—There are eight well defined segments. All but the last have a transverse row of sharp, claw-like dark-brown spines across the dorsum of the segments, becoming quite long and yellow on the sides of the segments and diminishing in length on the venter. These ventral bristles increase in length, on each segment, as they near the last segment. For the location of these spines and bristles see drawing (fig. 2).

At the apex of the abdomen are four large, very rugose, reddish-brown, chitinous tooth-like spurs; between the lower pair on the dorsum, are two

small, rounded, brown tubercles. Below these tubercles, on the dorsum is a small, rounded, frosted area.

About half way between this area and the base of the segment, is a large, sharp, claw-like, dark spine; at the base of this is a smaller, dark spine with two points at the apex. Between these spines and the segmental line is another sharp spine, near the base of which is a small, rounded, roughened, dark spot, which is the remains of the large posterior spiracle.

On the ventral side of the last segment are two very large tubercles, semi-transparent and darkened on the inner edge to the apex.

The under side of the thorax has two short, robust, claw-like spines, bifurcated at the apex and each having a short yellow spine, near the middle of the inner side. These spines are yellow with a reddish-brown edge.

On the side of all the segments, except the last, and close to the cephalic edge, is a reniform spiracle, it is like the humeral one except the curved side is on the opposite side.

The adult emerges through a longitudinal, dorsal slit, in the thorax and bursting of the sutures of the head.

Criorhina (Somula) decora Macq.

Dipt. Exot., Suppl. II, p. 57.

The larvae¹ of this species were taken from a pocket in a living Tulip tree, by the writer, at Falls Church, Va., November 29, 1912. This pocket was filled with black frass, composed of dead vegetation and moistened with rain water and sap from the tree. Pupation took place in the larval skin, from April 8, to 18, 1913. The adults emerged from April 17 to May 1, 1913. All emerged during the night.

Egg.

On May 13, 1915, a female of this species was observed during oviposition. There was a large living tree with a small pocket near the ground, which was filled with frass composed of decayed leaves, etc., and rather moist with the sap. The fly flew around this tree several times, making a loud humming sound, and then alighted on the moist frass. After walking around on this frass for a few seconds, with the abdomen moving up and down, the fly stood still for a few seconds, with the tip of the abdomen touching the frass. Suddenly a tiny white egg appeared. This performance was repeated before the disposition of each egg and

¹ Twice during the winter these larvae were frozen. Ordinarily they are opaque but when frozen they were transparent and colorless. Shortly after thawing, and returning to the opaque, all 14 larvae pupated. From these 13 adults emerged.

after laying two or three eggs the fly would leave the pocket and encircle the tree a few more times, then return and repeat the above habit. The eggs were left exposed. The fly was nearly two hours depositing twelve eggs.

The egg is opaque, white, cylindrical and tapering slightly towards each end. The surface is very faintly reticulate. It is 0.75 mm. in length and the diameter is equal to half the length.

Larva (plate XVIII, fig. 1).

This larva is a typical rat-tail type. Body elongate, elliptical, and very rugose transversely. It is opaque, grayish-yellow with a little white showing through. The tail is grayish-brown and darker than the body. The body is completely covered with a fine, pale yellow pubescence which is longer on the lateral edges. Cephalic end rounded. Caudal end tapers down to the rat-tail which is cylindrical. A narrow area across the front of the head, is beset with minute spines which are pale yellow at the base and dark yellowish-brown at the apex. The dorsum of the first segment has seven longitudinal, faintly impressed grooves, the end grooves are the smaller. At the base of the second groove is a small, tubercular, chitinous, dark brown spiracle, opening on the outside.

The tail is very slightly larger at the base than at the apex; the sides being almost parallel. On the lateral edge at the base of the tail, is a tubercle with a tuft of long yellow pubescence at the apex. Just below this tubercle is a similar, but smaller one. On each side of the apical end of the tail is a very small, transparent, colorless, cylindrical projection, terminating into a hair-like projection. The tail is composed of three sections; the apical and middle sections are retractile into the basal one. The apical section is somewhat chitinous, especially at the apex.

The mouth parts (fig. a) are entirely suctorial. The buccal cavity is darkened on its edges and is located just beneath the apex and between two large, rounded, fleshy folds. Just above the edge of the buccal cavity are the antennae; they are white and form one solid trunk at the base which is bifurcate on the apical half. Each half is divided at the apex, appearing like two small, yellow, chitinous thimbles. The inner one has a small tubercle at the apex (fig. b).

When disturbed, the antennae are drawn into the buccal cavity.

Just below the buccal cavity is a pair of ampullae, the next segment does not have any, the following six segments each have a pair. Each ampulla has a number of yellowish-brown bristles, hooked outwardly on the end; and are located near the apex.

The larvae when full grown, average, in the body, 12 to 15 mm. in length and 5 mm. in width, and nearly cylindrical. The tail is 5 to 6 mm. long, 1 mm. diameter at the base and tapering slightly towards the apex. When the tail is fully extended it reaches about 19 mm. in length.

Pupa (fig. 2).

Same general shape as the larva, but more cylindrical and smooth. It is dark yellowish-brown and sparsely covered with a short, yellow pubescence. They average 11 mm. in length and 4.3 mm. in diameter.

On the dorsum near the apex are two very small tubercular, dark-brown, chitinous spiracles. Behind this pair is another much larger pair with the apical portion bent back. They are more yellowish than the pupa skin, and slightly shiny.

From the dorsal aspect, this spiracle has seven small, raised, pad-like areas which are evanescent on the ventral portion. These areas and the ventral side are covered with minute tubercles. (See fig. e.)

The tail is bent along the side of the body or up over the dorsum. The chitinous tip of the third section protrudes from the tip of the first.

***Brachyopa vacua* O. S.**

Bull. Buff. Soc. Nat. Hist., III, p. 68.

The larvae were collected at Falls Church, Va., November 30 to December 2, 1912, by the writer. They were found under dead bark (*Liriodendron*) in the juice of decaying fungi. Some of the larvae were brown and some black. The juice of the fungi was brown in some places and black in others and the larva was of the same color as the juice in which it was found. A larva of each color was isolated and the result was a ♂ in each case.

Exact time of pupation not known. All the adults emerged during the night, from April 5 to 14, 1913.

Larva¹

Larva.—Opaque, dull, light yellow-ochre with the entire body finely rugose. First segment somewhat pointed. Larva reaches its greatest width at the fourth segment and gradually decreases in width towards the caudal end. The dorsum is very rugose transversely; in the middle of each segment is a transverse depression or groove. On the lateral edge, near the apex of the first segment, is a small spiracle. It is conical in shape, of a dark reddish-brown color and of a chitinous texture. On the dorsum of the first segment are six faint, longitudinal ridges reaching almost to the apex, also a transverse row of six fleshy tubercles near its base and all the other segments have a row of 8 or 10 similar tubercles, just above the center. Two or three tubercles on each end of each transverse row, terminate into three or four fleshy, bristle-like projections; while the other tubercles terminate into two such projections.

At the base of the first, and the base and apex of all the other segments, is a row of short, fleshy, bristle-like projections.

¹ The larva and pupa look so much alike, that only the pupa was drawn.

At the base of the first segment is a row of small, fleshy, bristle-like projections; all the other segments have three rows each of similar projections.

Between the large tubercles on the lateral edge (which are the ends of the transverse rows) are numerous fleshy, bristle-like projections, which are longer than those on the dorsum.

The caudal or posterior spiracle is nearly cylindrical, mostly dull black and shiny at the apex. On the apex are two small, circular, pit-like openings.

The mouth is a fleshy opening, of the suetorial type and retractile between two large, rounded, fleshy folds.

The palpi are located just above the buccal opening and are retractile. The base is whitish and nearly cylindrical and bifurcated at the apex; these bifurcations are yellowish-brown and have a depression or groove on both sides, giving this upper portion the appearance of two cylinders fused together; the inner cylinder slightly shorter than the outer one.

For details see drawing (fig. d).

The entire ventral surface of the larva is covered with minute, brownish-black spines.

Larva is 7 mm. long in the body, posterior spiracle 1 mm. making a total of 8 mm. in length and 3 mm. wide, being nearly cylindrical.

Pupa (plate XIX, fig. 3).

Pupation takes place in the larval skin. The puparium looks like the larva except the characters noted. It is much smoother and the segmentation is hardly noticeable. All the fleshy, bristle-like projections are very much compressed and shriveled. In profile, the puparium slopes from about the middle of the second segment to the apex of the first, having a wedge-shape appearance. On the dorsum of the first segment are four short ridges, all meeting at the apex. Near the center of the transverse ridge, in the middle of the second segment, are two conical spiracles, curved outward; they are reddish-brown, slightly shiny at the apex, and have numerous small tubercles, around the sides with one located at the apex.

It is 7 mm. in length, 4.75 mm. in width and nearly cylindrical. The adult emerges by pushing off the dorso, apical portion of the puparium which breaks transversely across the segmental line.

Pseudotephritis corticalis Loew.

Mon. N. A. Dipt. III, p. 136.

These larvae were collected at Falls Church, Va., February 18, 1913 by Messrs. S. A. Rohwer and Wm. Middleton, in frass, under the bark of chestnut (*Castanea dentata*).

Pupation took place in the larval skin, March 16, 1913 and the adults emerged April 16 to 18, 1913.

Larva (plate XX, fig. 2).

Larva.—It has eleven segments, is opaque white, very faintly yellowish at the base of the segments, cylindrical and tapering to a point at the head. They vary from 3 to 6 mm. in length and 1 to 1.5 mm. in diameter.

The head is retractile into the first segment, is bilobed and each lobe has a very minute tubercle at the apex and on the under side of each lobe is a series of brownish, roughened, transverse lines. Between these lobes are two dark reddish hooklets.

The anterior spiracles are white, quite small, semi-circular and beaded along the edge; in some specimens the beads are round, while in other specimens they are rounded at the top and pointed at the base; there are ten of these beads to each spiracle. This spiracle is located on the side and at the base of the first segment. Along the lower front edge of the first segment is a narrow roughened area (fig. a).

Segments four to ten each have a small, ventral fusiform area, on the front edge, which is formed by a series of raised, roughened brown lines.

On the under side of the last segment, near the middle or anal area, is a large, rugose area which is somewhat semi-circular in form. There is a very small depression on each side of the anal opening.

The last segment has a shiny, faintly yellowish rectangular depression on the end. Near the middle of this depression are two yellowish-brown, button-shaped, raised, spiracles which vary from nearly round to elliptical. On each of these chitinized plates are three oblique slits. Just above these slits is a small impression like an asterisk, which is concolorous with the larva. The two stigmal plates are separated by a small Y-shaped depression (fig. b).

Pupa (fig. 3).

The pupa is brownish-yellow, cylindrical, tapering slightly towards the head where the color is a deeper brown. It is 4.5 mm. in length and 1.25 mm. in diameter. The entire pupa skin is sharply marked with very narrow, transverse ridges. All the transverse, segmental lines of the larva are visible on the pupa skin, where they appear as very fine rugose surfaces. The end of the last segment has a sharp edge or carina around it forming somewhat of a hexagon; in this hexagonal area are the posterior spiracles which are like those of the larva with the addition of a small stem on the inner side, which points upward and outward.

The adult emerges by splitting the puparium and forcing its way through this slit.

PLATE XVII.

Fig. 1. *Mydas clavatus* Drury, larva.
 Fig. 2. *Mydas clavatus* Drury, pupa.
 Fig. 3. *Mydas clavatus* Drury, posterior spiracle, enlarged.
 Fig. 4. *Neopachygaster maculicornis* Hine, larva.

PLATE XVIII.

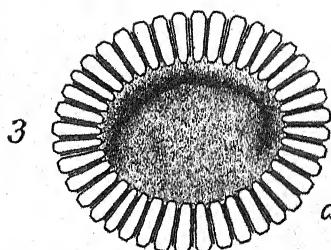
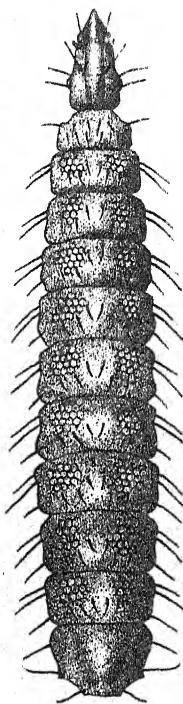
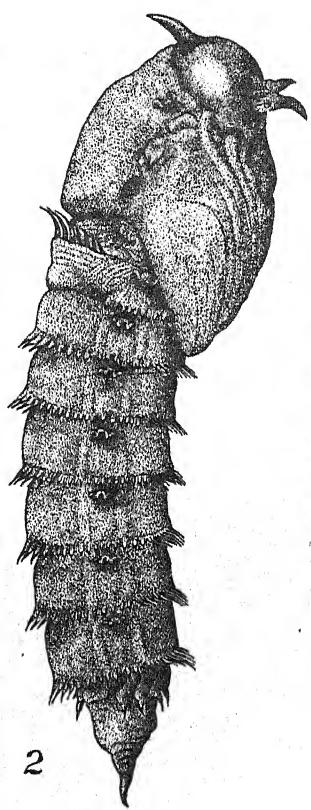
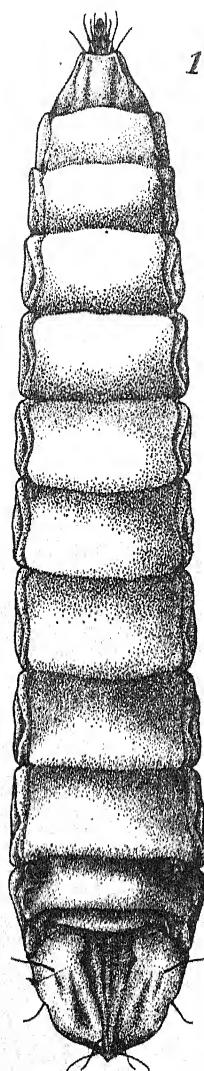
Fig. 1. *Dasyllis thoracica* Fabr., larva.
 Fig. a. *Dasyllis thoracica*, anterior spiracle.
 Fig. 2. *Dasyllis thoracica*, pupa.
 Fig. b. *Dasyllis thoracica*, lateral spiracle of pupa.
 Fig. 3. *Dasyllis thoracica*, pupa, lateral view.
 Fig. 4. *Dasyllis thoracica*, mouth parts, ventral view.
 Fig. 5. *Dasyllis thoracica*, mouth parts, dorsal view.

PLATE XIX.

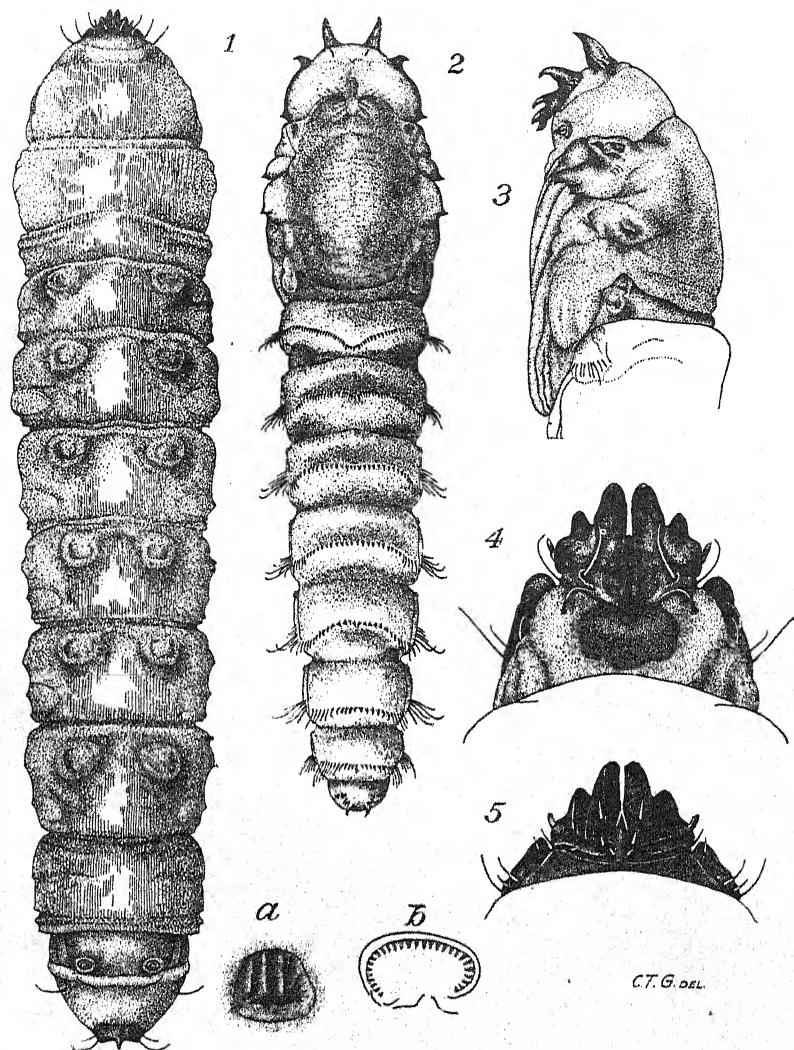
Fig. 1. *Criorrhina (Somula) decora* Maeq., larva.
 Fig. a. *Criorrhina (Somula) decora*, mouth parts.
 Fig. b. *Criorrhina (Somula) decora*, antennae, enlarged.
 Fig. 2. *Criorrhina (Somula) decora* pupa.
 Fig. c. *Criorrhina (Somula) decora* spiracle enlarged.
 Fig. 3. *Brachyopa vacua* O. S., pupa.
 Fig. d. *Brachyopa vacua*, antennae.

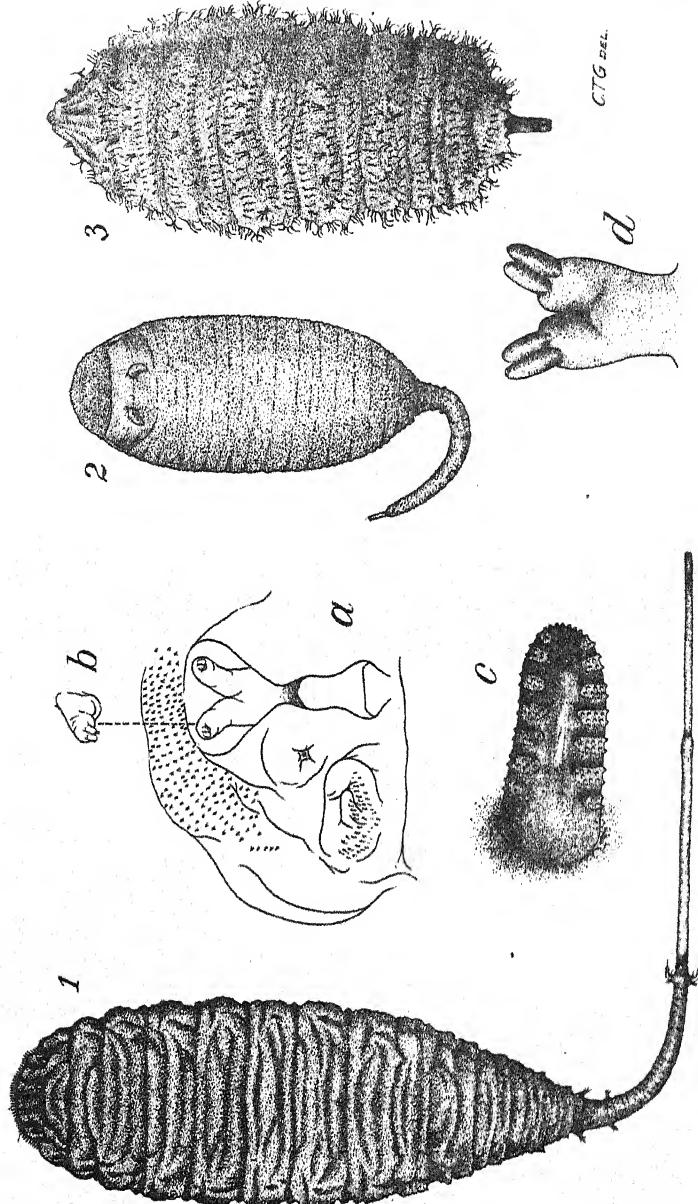
PLATE XX.

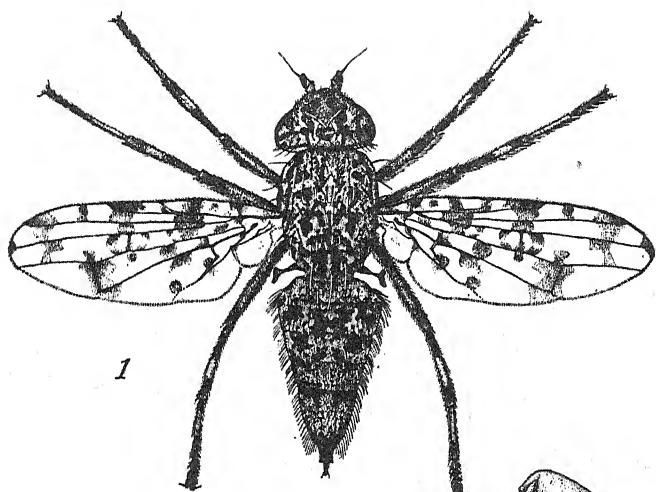
Fig. 1. *Pseudotephritis corticalis* Loew, adult.
 Fig. 2. *Pseudotephritis corticalis*, larva, lateral view.
 Fig. a. *Pseudotephritis corticalis*, larva, lateral view of head.
 Fig. b. *Pseudotephritis corticalis*, larva, end view.
 Fig. 3. *Pseudotephritis corticalis*, pupa.



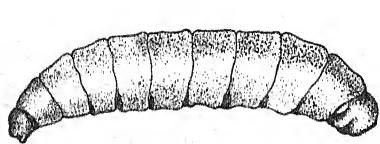
C.T.G. DEL.



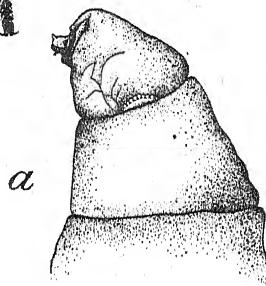




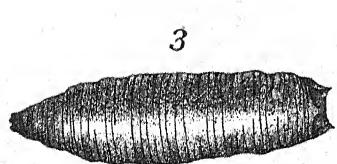
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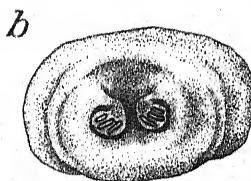
2



a



3



b

C.T.G. del.

A MUCH DESCRIBED ICHNEUMONID AND ITS SYSTEMATIC POSITION.

BY R. A. CUSHMAN,

Bureau of Entomology.¹

The difficulties of the student of the Ichneumonidae are well demonstrated by the vicissitudes through which the species discussed below has passed.

In 1868 Cresson described, from the male only, his *Mesoleptus* (?) *muliebris*.

In 1875 Provancher described, from the female, *Mesostenus rufipes*, which, in 1879, he transferred to the genus *Mesoleptus*.

In 1880 Provancher described, from the female, *Echthrus pediculatus*, and, in 1886, *Mesostenus pleuricinctus*, also from the female.

In 1894, Davis, who had examined a large number of the Provancher types, synonymized *Mesoleptus rufipes* Provancher and *Echthrus pediculatus* Provancher, which latter he doubtfully referred to the genus *Euxorides* Cresson.

In 1895, Davis, after having examined more of the Provancher types, added *Mesostenus pleuricinctus* Provancher to the above synonymy, and stated that "they are all, with very little doubt, synonyms of Cresson's *Mesoleptus* (?) *muliebris*, which is the male." In this paper Davis, considering the species more likely cryptine than tryphonine or pimpline, referred it, because of the lunulae, to the tribe Phaeogenini, evidently considered by him cryptine rather than ichneumonine, and placed it in Foerster's genus *Diacritus*, thereby making it the genotype of *Diacritus* Foerster.

Dalla Torre adopted Davis' synonymy and generic conclusions, and Viereck gives as the genotype of *Diacritus*, *Mesostenus rufipes* Provancher.

Since the publication of Davis' synonymy this species has been again described, this time by Viereck under the name *Plectiscidea* (*Aperileptus*?) *contentionis*.

In 1875 Provancher described from the male his *Mesoleptus variabilis*, which he later (1879) synonymized with *muliebris* Cresson. But, as will be shown later, this synonymy is incorrect.

Mr. S. A. Rohwer has recently examined the Provancher types, and there is in the National Museum a specimen of this species which is a Rohwer homotype of all of Provancher's species except, of course, *variabilis*. At the time he examined the types Mr. Rohwer was of the opinion that *variabilis* Provancher can not be the male of the present species, but that it is a mesoleptine. In

¹ Published by permission of the Secretary of Agriculture.

the Mesoleptini, his notes state, it runs in Davis' key to *Zemiodes* Foerster or *Clepsiorthus* Foerster, but is apparently neither of the species listed thereunder.

In 1882 Provancher again used the name *Mesoleptus variabilis*, this time for another species, which Mr. Rohwer is of the opinion is the same as *Euryproctus sentiris* Davis. In arriving at this conclusion Mr. Rohwer ran the Provancher type in Davis' key to the Mesoleptini and compared it with the original description of *E. sentiris*. Provancher's name, being preoccupied in *Mesoleptus*, will, if it is the same as *E. sentiris*, have to give way to Davis' name and the species be known as *Euryproctus sentiris* Davis.

In the National Museum is a specimen from Meklenburg, Germany, labelled *Phidias aciculatus* Vollenhoven, genotype of *Phidias* Vollenhoven, which specimen is congeneric with the species under discussion. If this specimen is correctly determined, which appears doubtful, *Phidias* Vollenhoven must fall as a synonym of *Diacritus* Foerster (Davis). I have not seen the genotype of *Plectiscidea* Viereck, but if his *P. contentionis* is correctly referred to the genus it too must be synonymous with *Diacritus*.

As for the systematic position of *Diacritus*, it can certainly not be left, where Foerster placed it, in the Phaeogenini. Practically the only way in which it resembles the other genera of that tribe is in the possession of lunulae on the tergites, and it is most certain that the species on which Foerster based his genus is not congeneric with the genotype. The genus, however, must follow its type species, and it is the opinion of the writer that the more prominent characteristics of the genus, especially the very narrow first abdominal segment with its prominent spiracles, ally it more closely with certain genera in the Plectiscini than with any other group. In Foerster's key to his family Plectiscoidae it runs directly to *Blapticus* Foerster, but differs markedly from the description of that genus. If its possession of an areolet is ignored it runs to *Entelechia* Foerster, and, from the description of that genus, is evidently rather closely allied to it.

Genus *Diacritus* Foerster (Davis).

Head broader than thorax; eyes large, nearly parallel within; temples strongly sloping; occipital carina strong; malar space somewhat shorter than basal width of mandible; face much wider than long, slightly elevated in middle; clypeus separated, weakly convex, much broader than long, subtruncate at apex; antennae nearly as long as body, first joint of flagellum very long, much longer than second, apical joint in female large, twice as long as penultimate, in male, flagellum tapering toward apex; notauli deep, meeting on disk of mesoscutum, prescutum gibbous; prepectal carina very strong and complete; propodeum longer than combined height of propo-

deum and metapleura, all longitudinal carinae but only apical transverse carina present, latter very strong and very close to apex, petiolar area very short; spiracle very near base; legs long, slender, hind basitarsus nearly as long as rest of joints combined; wings large, reaching to apex of abdomen, areolet oblique quadrangular, first abscissa of radius straight, second decurved; stigma lanceolate, radius originating in middle; nervellus broken below middle, brachiella more or less developed; abdomen petiolate, first tergite very narrow, nearly cylindrical, barely wider at apex than at base, slightly decurved, spiracles prominent, slightly before middle; tergites beyond first in female suddenly much wider, in male gradually wider, 2-4 with distinct lunulae and 2 with large thyridia; ovipositor nearly as long as body, compressed.

Type.—*Diacritus muliebris* (Cresson).

Diacritus muliebris (Cresson).

Mesoleptus (?) *muliebris* Cresson, Trans. Am. Ent. Soc., II, 1868, p. 102, ♂.
Mesostenus rufipes Provancher, Nat. Can., VII, 1875, p. 263, ♀.
Mesoleptus rufipes Provancher, Nat. Can., XI, 1879, p. 226.
Echthrus pediculatus Provancher, Nat. Can., XII, 1880, p. 99, ♀.
Mesostenus pleuricinctus Provancher, Addit. Faun. Ent. Can., Hym., 1886, p. 76, ♀.
Euxorides (?) *pediculatus* Provancher, Davis, Proc. Ac. Nat. Sci. Phil., 1894, pp. 184-190.
Diacritus rufipes Provancher, Davis, Can. Ent., XXVII, 1895, pp. 288-289
 (=? *Mesoleptus muliebris* Cresson).
Diacritus rufipes Provancher, Dalla Torre, Cat. Hym., III, 1902, p. 770
 (=? *Mesoleptus muliebris* Cresson) (=? *Mesoleptus variabilis* Provancher, 1875 not 1882).
Diacritus rufipes Provancher, Viereck, Bul. 83, U. S. Nat. Mus., 1914, p. 43.
Plectiscidea (*Aperileptus*?) *contentionis* Viereck, Conn. State Geol. & Nat. Hist. Survey, Bul. 22, part III, 1916, p. 276, ♀.

A review of the above synonymy shows that the species has been described under five specific names, and referred to six genera representing five tribes and, including the original placing of *Diacritus*, all five of the subfamilies of the Ichneumonidae.

Description from types of Cresson and Viereck species, Rohwer homotype of Provancher species, and other material of both sexes.

Female.—Length 7 mm.; antennae 6 mm.; ovipositor 3 mm. Head and thorax, except metapleura and propodeum, polished, nearly without sculpture; face about two-thirds as long as wide, obscurely shagreened but shining; clypeus nearly twice as broad as long; malar space two-thirds as long as basal width of mandible; metapleura and propodeum, except petiolar area, roughly coriaceous, petiolar area polished; abdomen, including first tergite shagreened, subpolished apically; first tergite without dorsal cari-

nae, but with strong lateral carinae from base to spiracle and from spiracle to apex.

Black, with whitish to yellowish markings as follows: mandibles, palpi, apex of clypeus, antennal insertions, scape and pedicel beneath, pronotum anteriorly, propleura largely, front and middle coxae and trochanters, hind trochanters below, tegulae, spot below, scutellum and post scutellum, tergal sutures, and apical tergite; antennae brown; legs testaceous, hind tibiae and tarsi fuscous; wings hyaline.

Male.—Differs from female principally in color, the markings being paler and embracing the entire face, cheeks, entire ventral surface of thorax except metasternum, extending up nearly to dorsal margin of mesopleura, ventral surface of all legs except tarsi, a central spot on mesoscutum, occasionally a small spot on each side of prescutum, more or less obscure spots laterally on propodeum, and much broader bands on abdomen.

Zemiodes (?) variabilis (Provancher).

Mesoleptus variabilis Provancher, Nat. Can., VII, 1875, p. 115, (not 1882).
Mesoleptus muliebris Cresson, Provancher, Nat. Can., XI, 1879, p. 227.

Provancher synonymized these two, but the synonymy is incorrect.

Euryproctus sentiris Davis.

?*Mesoleptus variabilis* Provancher, Nat. Can., XIV, 1882, p. 7. (not 1875).
?*Mesoleptus provancheri*, new name for *variabilis* Provancher, 1882 not 1875.
Euryproctus sentiris Davis, Trans. Am. Ent. Soc., XXIV, 1897, p. 330.

NEW HYMENOPTERA.

By J. C. CRAWFORD.

Hesperapis Ckll.

Professor Cockerell has recently (*Psyche*, XXIII, 176-178, 1916) published on the synonymy of this group, and at present it seems best to treat *Zacea* and *Panurgomyia* as synonyms of this genus. *Z. rufipes* is very similar to the genotype of *Hesperapis* and is probably the male of a very closely allied species. *Panurgomyia fuchsi* belongs to the group of *H. eumorpha* and (*Panurgus*) *H. regularis* Cress. and is very close to *regularis*. The type of *fuchsi* is in bad condition and the identification is, therefore, somewhat uncertain.

The following table will separate the males of the group of *rhodocerata* and allies, that is those in which the propodeal triangle is not closely punctured but mostly smooth.

1. Wings perfectly clear..... *lurrae* Ckll.
- Wings not perfectly clear..... 2
2. Inner orbits parallel..... *laticeps* n. sp.
- Inner orbits converging below..... 3
3. Apex of wings whitish..... *oliviae* Ckll.
- Apex of wings not whitish..... 4
4. Legs entirely fulvous..... *fulvipes* n. sp.
- Legs mostly dark..... 5
5. Tarsi and spot on tegulae reddish; veins light brown. *rhodocerata* Ckll.
- Tarsi and tegulae black; veins almost black..... *arenicola* n. sp.

***Hesperapis laticeps* new species**

Male.—Length 9 mm. Black, head broader than thorax, inner orbits parallel; vertex high; face laterad of ocelli not depressed; cheeks at upper end of eye convex in outline; face finely sparsely punctured, surface almost concealed by the dense white pubescence; anterior margin of clypeus reddish; labrum and mandibles, except the red apical portions, honey color; tip of one mandible reaching to base of other; joints of labial palpi almost equal in length; flagellum light reddish beneath; thorax and propodeum, except triangular enclosure covered with dense white hair; mesonotum finely sparsely punctured; base of propodeal triangle finely wrinkled, the wrinkles nearest metanotum parallel to the posterior edge of that sclerite; the wrinkles beyond these broken medially and the inner ends turning caudad; rest of triangle, except apical part, finely reticulated; tegulae with a large reddish spot; wings slightly dusky; veins light brown; first cubital cell over one-third longer than second; legs brown; abdomen dark brown, closely and finely punctured with short brown pubescence, apical margins of segments 1-6 with a band of white appressed pubescence.

Type locality.—Panamint Valley, California, (April, 1891, A. Koebele coll.)

Eight specimens; type and paratypes a and b with the above record; paratypes c-g from the Panamint Mts., (April, 1891, Koebele), the latter series have evidently been in alcohol and are badly rubbed.

Type.—Cat. No. 21160 U. S. N. M.

***Hesperapis fulvipes* new species.**

Male.—Length 11 mm. Black, with slightly ochraceous pubescence, long and dense on thorax and very dense and almost white below antennae; face finely sparsely punctured; inner orbits distinctly converging; face laterad of ocelli concave; anterior margin of clypeus and labrum almost honey color; base of mandibles yellowish, tips ferruginous; flagellum reddish, somewhat darker above; mesoscutum with sparse small punctures, punctures of scutellum closer; propodeum smooth, extreme base indistinctly reticulated, tegulae testaceous; wings faintly dusky; stigma and

veins honey color; legs reddish, more yellowish apically; coxae darker; abdomen finely sparsely punctured with scattered ochraceous hairs and slightly ochraceous bands in segments 1-5, segment 6 almost entirely covered covered with sim lar hair; venter largely rufous.

Described from two males from San Diego County, Calif., collection Coquillett, the paratype somewhat less than 10 mm. long.

Type.—Cat. No. 21161 U. S. N. M.

***Hesperapis arenicola* new species.**

Male.—Length 10 mm. Black, with ochraceous pubescence, dense on head and thorax and very dense and almost white below antennae; inner orbits distinctly converging; mandibles dark with reddish tips; face finely rather sparsely punctured; face in outline laterad of ocelli concave; cheeks in outline at top of eyes concave; first joint of labial palpi about as long as joints 2 and 3; antennae dark, obscurely reddish beneath at extreme tip; mesoscutum and scutellum rather closely and finely punctured, the punctures becoming sparse mesad; propodeum smooth, shiny, with a very short dorsal row of longitudinal rugulae; posterior face of propodeum with scattered punctures; tegulae black, wings slightly infuscated, stigma dark brown, the margins darker, veins almost black; legs black with ochraceous pubescence; abdomen with minute rather close punctures, with long scattered ochraceous hairs and apical bands of lightly ochraceous hair on segments 1-6.

Described from seven males collected by E. A. McGregor with the record "Indio sands, Coachella Valley, Calif., March 19, 1917."

Type.—Cat. No. 21162 U. S. N. M.

The specimens vary in size from about 10.5 mm. to 8.5 mm.

***Epeoloides* Giraud.**

The genus *Viereckella* Swenk is a synonym and the included species are *obscura* Swenk and *pilosula* Cresson; *nearcticus* Ducke and *ceanothina* Cockerell are synonyms of *pilosula*.

***Trachusa manni* n. sp.**

Male.—Length 14 mm. Black, clypeus and lateral face marks, truncate above and extending slightly above clypeus, creamy white; mandibles 3-toothed; pubescence on occiput and on dorsum of thorax deep ochraceous tinged with reddish; on front light ochraceous, below antennae almost white, on pleurae ochraceous fading into white below; clypeus with strong well separated punctures, medially longitudinally elevated but not carinate; facial quadrangle, measured from mandibles to top of eye slightly longer than wide; punctures above antennae strong, close; mesoscutum rugoso-punctate; propodeum with a basal area extending onto posterior face and defined by an impunctate line, the dorsal aspect of area with punctures

separated by about a puncture width, the interstices lineolate, posterior face of area lineolate; propodeum outside of area with punctures about as on dorsal face of area; wings brownish, more so apically and along anterior margin; second recurrent vein interstitial; transverso-medial not exactly interstitial, the exterior margin of the vein about in line with the interior margin of the basal vein; legs black, their pubescence almost white, that on inner side of basal joint of hind tarsi strongly reddish; hind tibial spurs dark brown; abdomen with hair bands on apical margins of segments 1-5, that on segment one ochraceous, rest white; segment one closely punctured, punctures on segments 2-5 decreasing successively in abundance, most of segment 6 rugoso-punctate; sixth segment with a strongly elevated carina near apex, broadly interrupted medially and laterally extending forward almost to base of segment but with decreasing elevation; apical margin of segment with a produced plate as broad as interruption in carina, which is smooth, slightly curved apically and with rounded corners; seventh segment with a longitudinal carina, the apex produced, deeply and broadly emarginate, the productions subtriangular in outline and somewhat reflexed.

Type locality.—Ramsey Canon, Huachuca Mts., Ariz.

Type.—Cat. No. 21836, U. S. N. M.

Described from two males collected by Dr. W. M. Mann, in honor of whom it is named. Paratype in the collection of Dr. Mann.

Differs from the description of *T. perdita* Ckll. in its larger size, deeper color of pubescence, shorter facial quadrangle, interstitial second recurrent vein, lack of a median carina on sixth segment and presence of one on the seventh segment, etc.

Stelis manni n. sp.

Female.—Length over 11 mm. Black, robust, with yellow ornamentalations as follows: lateral face marks extending almost to summit of eyes and slightly obliquely truncate above; a transverse stripe behind ocelli extending down behind eyes almost one-fourth the length of eye; lateral and anterior margins of scutum, broadly interrupted medially in front, axillae, spot on each side of scutellum, lateral margin of tubercles, a broad band on disc of segments 1-5 successively increasing in width, broadly interrupted medially and emarginate behind on segments 1-2, a minute spot on each side of segment 6; band on fifth segment covering all but depressed apical margin of segment; head and thorax with large crowded punctures; mandibles, scape, pedicel, first two joints of funicle, reflexed lateral margin of scutum, tegulae and most of tubercles, reddish; wings dark brown, second recurrent vein well beyond apex of second cubital; femora except apices black; rest of legs red, the tarsi basally more yellowish; abdomen closely punctured, punctures on sixth segment crowded and finer; depressed apical margins of segments translucent, in front this narrowly

reddish; apical half of sixth segment reddish, the margin crenulate; last ventral segment hardly surpassing last dorsal; ventral segments strongly, closely punctured, depressed apical margins translucent, preceded by a reddish band.

Type locality.—Ramsey Canon, Huachuca Mts., Arizona.

Type.—Cat. No. 21837, U. S. N. M.

Described from one female taken by Dr. W. M. Mann, after whom it is named.

Differs from *S. australis* in being larger and more robust, in the crowded punctures of head and mesonotum, the yellow band back of ocelli, the translucent apical margins of abdominal segments, preceded by the reddish stripe, the close punctures of ventral segments three and four, etc. *S. australis* has the apical margin of sixth segment more toothed than crenulate but medially there is a truncate projection medially emarginate.

Halictus.

The following key can be used to separate the females of the Philippine species of *Halictus* known to me:

1. Green *taclobanensis* Ckll.
Black 2
2. Tibiae yellow *manilae* Str. non Ashm
Tibiae black 3
3. First abdominal segment with distinct strong punctures 5
First abdominal segment impunctate or punctures microscopic 4
4. Larger (over 8 mm.) with strong bands of appressed pubescence on bases of segments and on apical margins of 3 and 4 *manilae* Ashm.
Smaller, slender (about 6 mm.) with at most weakly indicated bands on margins of segments *nesiotus* n. sp.
5. First abdominal segment sparsely punctured, the apical margin impunctate *philippinensis* Ashm.
First abdominal segment including apical margin closely punctured 6
6. Medial anterior margin of mesoscutum reflexed and carinate *baguionis* n. sp.
Medial anterior margin of mesoscutum not carinate *banahaonis* Ckll.

Halictus nesiotes new species.

Female.—Length about 6 mm. Black, with sparse whitish pubescence on head and thorax; face finely lineolate, clypeus with scattered large punctures; punctures on sides of face shallow, well separated; those on front finer, deeper; mesoscutum strongly lineolated and sericeous with fine punctures separated by about twice a puncture width; scutellum with a few scattered very fine punctures; propodeum without an enclosure, the base with a few rugulae not reaching apex, rest of surface finely indistinctly

lineolate; posterior face without a surrounding carina; tegulae testaceous; wings dusky; veins brown, stigma darker, first recurrent almost interstitial; second transverse cubital and veins beyond very faint; third cubital almost twice as long as second, hardly narrowed above; legs black, pubescence whitish, tinged with yellowish within, especially on basal joint of hind tarsi; inner hind spur with four teeth; abdomen smooth, polished, almost impunctate, there being very minute microscopic scattered punctures, thinly clothed with whitish pubescence, forming thin apical bands especially on segments 3 and 4; apical margins 1-4 broadly testaceous.

Type locality.—Baguio, Luzon, P. I.

Type.—Cat. No. 21361 U. S. N. M.

Two females received from Col. Wirt Robinson.

Much smaller and more slender than *manilae* Ashm., without the abundant ochraceous pubescence of that species and without strong bands of appressed pubescence on bases of segments and on margins of 3 and 4, etc.

***Halictus manilae* Ashm.**

Strand's description of his *luzonicus* exactly fits this species and is probably the same.

From Baguio, Luzon, three females received from Col. Wirt Robinson.

***Halictus philippinensis* Ashm.**

A long series with the above. The propodeal enclosure in this species is peculiar since it is not the triangular enclosure of other species but is formed by the carina surrounding posterior face of propodeum and by carinae running forward from the lateral angles of this carina and it is therefore four sided, with the sides diverging anteriorly. The carina surrounding posterior face is heart shaped.

***Halictus baguionis* new species.**

Female.—Length over 9 mm. Black, head and thorax with rather abundant long, strongly ochraceous pubescence; punctures of head strong, crowded, below antennae, rugoso-punctate, except clypeus where the punctures are coarse and sparse, becoming finer and closer at base, and the sparsely punctured supraelypeal area; lateral angles of pronotum strongly projecting, the projection forming a right angle; mesoscutum with the anterior margin medially reflexed and carinate; the area just back of this rugose; rest of mesoscutum with large strong punctures, those on disk well separated; punctures of scutellum finer; propodeum with a triangular enclosure bounded by a carina, the enclosure irregularly rugose; rest of surface of propodeum covered with pubescence (worn specimens show the posterior face rugulose and surrounded by a carina which is slightly

interrupted in the middle above); tegulae black with a reddish center and a deep testaceous margin; wings dusky, more sonapically; veins light brown, stigma darker; veins beyond second transverse cubital obsolescent second recurrent before apex of second cubital cell; third cubital cell one-third longer than second, narrowed one-half to marginal; legs black, pubescence ochraceous, that on outer side of tibiae, especially hind, black; inner hind spur with three long teeth; abdomen closely, finely punctured, including depressed apical margins of segments; bases segments 2-5 with light ochraceous hair bands; base of first segment covered with similar pubescence.

Male.—Length about 6.5 mm. Black, without any yellow markings; very similar to female, but tagulae, veins and stigma darker; base of seventh abdominal segment forming a semicircular polished and impunctate pseudopygidium with carinate edge which conceals true apex of segment.

Type locality.—Baguio, Luzon, P. I.

Described from 15 ♀♀ and 1 ♂ received from Col. Wirt Robinson, U. S. A.

Type.—Cat. No. 21360 U. S. N. M.

Very similar in general appearance to *H. banahaonis* Ckll. from which it differs in the carinate anterior margin of the mesoscutum, the strongly projecting lateral angles of the pronotum, the coarser punctures of the mesoscutum the absence of the carinae on the propodeum, running forward from the lateral angles of the carina surrounding posterior face.

CYNIPOIDEA.

Amblynotus slossonae new species

Female.—Length 4 mm., antennae about 2.25 mm. Black, head and mesonotum finely shagreened, pronotum at sides above rugulose, the sculpture becoming finer beneath; third joint of antennae longer than scape and pedicel combined; following joints successively decreasing in length; last joint over one and one-half times as long as 12th; parapsidal furrows complete, deeply cut throughout; posteriorly twice as broad anteriorly; parapsidal areas each with a longitudinal smooth line; middle lobe anteriorly with two lines and at apex with a median elongate triangular impression; scutellum coarsely rugose, basally with two large foveae separated by a carinate ridge; mesopleurae below coarsely striate, above finely granular with a few indistinct fine striae; wings basally strongly yellowish, the apical half very slightly so; coxae black, legs brown, becoming lighter distad; apical half of fore femora and the fore tibiae yellowish; abdomen strongly compressed, shiny, apical segments sparsely finely punctured.

Described from one specimen taken on Mt. Washington, New Hampshire by Mrs. Annie Trumbell Slosson, in honor of whom it is named.

Type.—Cat. No. 21566 U. S. N. M.

This specimen was determined as *A. opacus* Hartig by Ashmead and this record may have been published.

Easily separated from *bilineatus* Kieff by the coarsely sculptured scutellum, and the elongate depression at apex of mesoscutum. From *semirugosus* by the wide parapsidal furrows which are deeply impressed all their length, scutellum rugose all over, etc.

Amblynotus semirugosus new species

Female.—Length 3 mm. Black, head, mesoscutum and base of scutellum finely shagreened; antennae, except scape and pedicel, reddish; third joint of antennae longer than scape and pedicel combined, about five times as long as thick; following joints successively decreasing in length; last joint twice as long as 12th, about as long as third; parapsidal furrows posteriorly deeply impressed, narrow, on the anterior third represented only by a depression of the tegument; parapsidal areas each with a longitudinal line; middle lobe with two lines anteriorly, and a slight depression at apex medially; foveae at base of scutellum separated by a carinate ridge; apical half of scutellum coarsely rugose; carinae on propodeum curved strongly outward; wing slightly yellowish; legs light reddish; coxae black; abdomen somewhat compressed, smooth, shiny, with minute sparse punctures except on basal segment.

Described from one specimen labelled "Adiron. Mts., Axtion, N. Y., June 12-22, 1901, A. D. MacGillivray and C. O. [Houghton]."

Type.—No. 21567 U. S. N. M.

Differs from the description of *bilineatus* Kieff. in the much longer third antennal joint, the scutellum rugose apically, the carinae on propodeum not parallel, etc.

THREE HUNDRED AND FIFTH MEETING, JUNE 7, 1917.

The 305th meeting of the Society was entertained by the members of the Society from the Branch of Deciduous Fruit Insect Investigations, at the Saengerbund Hall, June 7, 1917. There were present Messrs. Barber, Boving, Craighead, Dietz, Ely, Fisher, Gahan, Greene, Heinrich, Kotinsky, McIndoo, Middleton, Paine, Rohwer, Sanford, Schwarz, Speare, Walton, and Wood, members, and Robt. Fouts, Geo. M. Greene, and E. R. Selkregg, visitors.

THE SIGNIFICANCE OF THE AUTHOR'S NAME FOLLOWING
A SPECIES.By A. B. GAILAN.¹A NEW SPECIES OF LONGHORN BEETLE INFESTING COWPEAS
FROM MEXICO.²

By W. S. FISHER.

*Specialist in Forest Coleoptera.***Lepturges spermophagus** n. sp.

Form elongate, convex and rather robust, fuscous, rather densely clothed with short fusco-cinereous pubescence, variegated with numerous, irregular fulvous spots. Head smooth, minutely and densely punctured, clothed with rather long cinereous pubescence; front long, slightly convex, with a fine median line; vertex deeply indented. Eyes moderately, coarsely granulate, large, prominent, deeply emarginate and very narrowly separated above. Antennae about two and three-fourths times as long as the body, sparsely ciliate beneath, not annulated. Prothorax trapezoidal, two times as wide as long; lateral spine rather broad and very close to base, the hind margin subtransversely, broadly and feebly sinuate from tip of the spine to the transverse median part of the base; surface even, except for a transverse subbasal impressed line of large deep punctures, densely finely punctate, and ornamented with eight irregular spots of dense fulvous, recumbent pubescence, four near the apex and four subbasal, the posterior lateral one near the base of the lateral spine, the four median ones, crescent shaped, with the tips pointing outwards and forming a parallelogram. Scutellum large, truncate at apex. Elytra one and two-thirds times as long as wide, only slightly wider than prothorax, the sides nearly parallel to apical third, then rounding posteriorly to the apices, which are broadly and separately rounded; surface even, except for an indistinct costa extending from middle near base to very near the apex, punctures coarse and rather dense at base, becoming gradually finer and more obsolete towards the apex, densely clothed with short fusco-cinereous pubescence and variegated with numerous irregular spots of fulvous pubescence. Femora, tibiae and tarsi of a uniform fuscous color, clothed with cinereous pubescence; femora all clavate. Surface beneath of a uniform fuscous color, evenly and rather densely clothed with moderately long, recumbent, cinereous pubescence. Coxae rather widely separated by the pro- and mesosternum, the middle ones separated by at least one-half the diameter of the coxae. Length 7 mm.; width 3 mm.

¹ Withdrawn from publication.² Contribution from the Branch of Forest Insects, Bureau of Entomology.

Habitat.—Tampico, Mexico. Mr. D. L. Crawford, Collector.
Type and paratypes.—Cat. No. 24423 U. S. N. M.

Described from four specimens reared March 1, 1914 from unripened seeds in the green pods of cowpeas by Mr. D. L. Crawford, which were submitted together with the work and larvae to the Museum for determination.

This species is more robust than any of our North American species and has the general form of our common *Leptostylus macula* Say, but the prominent lateral thoracic spine will exclude it from that genus. Our species of *Lepturges* are separated into two groups on the position of the thoracic spine, and if this character is used, *L. spermophagus* is closely allied to *L. symmetricus* Hald., but the position of this spine seems to be somewhat variable. In this species the coxae are more widely separated than in any of our North American species.

This is a very interesting species on account of its habits and is the second record of a species of longhorn beetle infesting leguminous plants, the other species, *Baryssimus leguminicola* was described by Mr. Linell from a single specimen taken from a jar containing the pods of one or more species of *Enterolobium*, a leguminous plant from Paraguay on exhibition at the World's Columbian Exposition at Chicago.

Mr. F. C. Craighead has supplied the following notes on the relationship of the larva of this species:

The larvae of the genus *Lepturges* form two distinct groups. Four species have been studied, *symmetricus* and *signatus* having three jointed maxillary palpi and a long chitinous spine on the ninth abdominal tergum; *facetus* and *quereli* having two jointed maxillary palpi and no spine. This distinction is certainly of generic value as its occurrence in other forms in the Lamiinae sets off well marked genera. This larva, *L. spermophagus* belongs to the *facetus* group and can be separated from all other Lamiids by the antennal ring being closed or angulate behind; two jointed maxillary palpi; two rows of tubercles on the ampullae and no caudal spine. From *facetus* and *quereli* it can be distinguished by the more robust form and velvety pubescence on the pronotum.

NOTES ON THE LARVAE OF SOME CEPHIIDAE.

BY WILLIAM MIDDLETON,

Scientific Assistant, Forest Insects, Bureau of Entomology.

This paper, which is a contribution from the branch of Forest Insects, Bureau of Entomology, is the first of a series which will deal with descriptions, notes and keys of North American Sawfly Larvae. The present paper is based on the available material of the family Cephiidae and consists of descriptions of five species

representing four genera which were made in connection with the study of the wood and pith boring Chalastogastra larvae.

In the preparation of this paper the larvae of the genus *Syntexis*¹ were examined but they were in such poor condition that their position could not be ascertained. In those characters least distorted this genus approached, though did not agree with, the Xiphydriidae rather than the Cephidae.

The presence of the anal prong in the larvae of the Cephidae allies them with the Siricids while the presence of palpiform appendages on the ventral anal lobe connects them with the Pamphilids. The taxonomic position which the Cephidae should occupy, will be discussed in more detail in a later paper.

Characters common to all the genera studied and probably to the family Cephidae:

Head.—Nearly round, mostly pale, mandibles and labrum darkened; maxillary palpi 4 jointed; labial palpi 3 jointed, (both palpi appearing indistinctly as if terminating in a small button); antennae 4-5 jointed; mandibles 4 toothed and with a smooth, slightly curved thin blade dorsally, under the labrum, (4th or ventral tooth small and on the inner edge of the mandible); frons and head generally rather sparsely spined.

Thorax.—A pair of fleshy, not jointed, mamma-like legs and a faintly yellowish, chitonized spot on the pleura, for each segment; prothorax with a similarly chitonized area dorsally.*

Abdomen.—Prolegs absent; terminating in a prong or horn, circular in cross section, short and arising from a spined, fleshy protuberance of the dorsal anal lobe; anal plate and ventral anal lobe haired; lateral area of dorsal anal lobe haired or bare, ventral anal lobe at posterior-lateral extremities with palpiform appendage appearing 2 jointed.

KEY TO LARVAE.

Antennae 4 jointed..... *Adirus trimaculatus* (Say) 1
Antennae 5 jointed.....

1. Lateral area of dorsal anal lobe bare

Janus abbreviatus Say and *integer* Norton

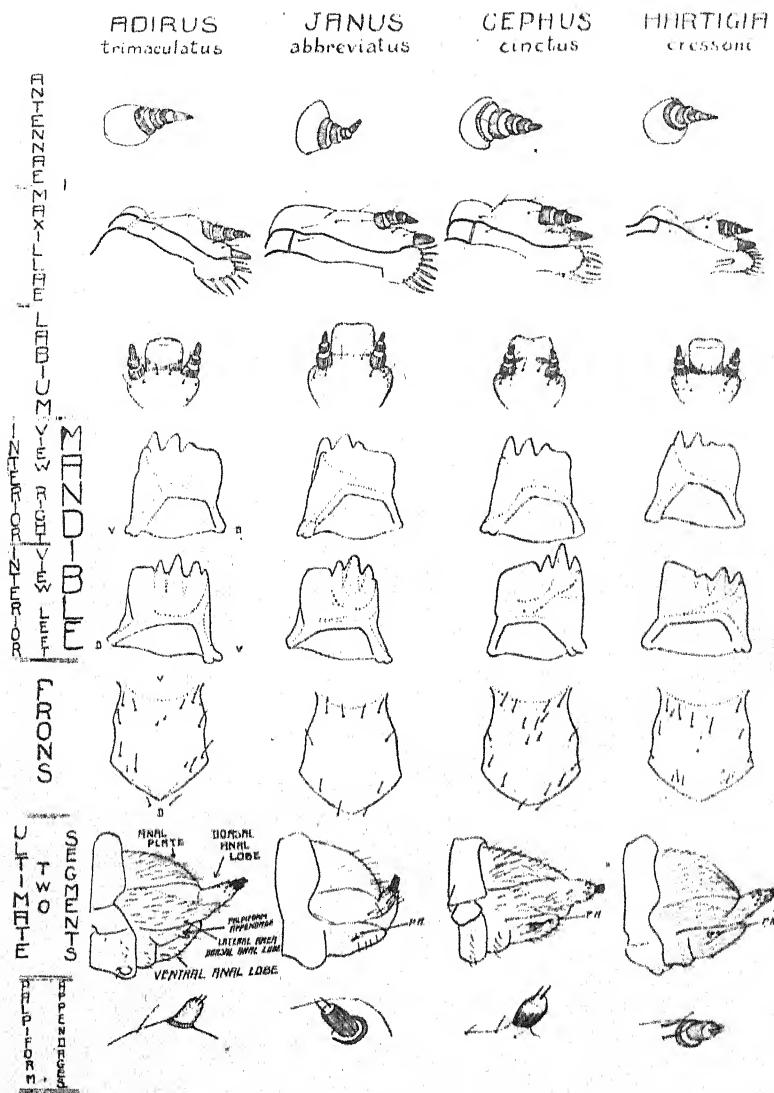
Lateral area of dorsal anal lobe haired..... 2
2. Basal joint of antennae faint and incomplete; palpiform appendages of

ventral anal lobe accompanied by a pair of spines, separate from rest of the ornamentation of lobe; without a pair of yellowish chitonized spots on venter of the 9th abdominal segment; anal lobes and plate entirely pale..... *Cephus cinctus* Norton

Basal joint antennae complete, distinct, and thick; spines on ventral anal lobe complete, no separation from those approaching palpiform appendages; venter of the 9th abdominal segment with a pair of yellowish chitonized spots; anal lobes and plate much yellow chiton

Hartigia cressoni (Kirby)

¹ S. A. Rohwer, Proc. Ent. Soc. Wash., Vol. XVII, No. 3, 1915, pp. 114-117.



Adirus trimaculatus (Say).

A somewhat pinkish-white, cylindrical larva with slightly enlarged thorax, 21 mm. long when nearly full grown.

Head.—Dorsad ventrad length 2 mm., breadth 1.66 mm., pale but with mandibles, their articulations, and labrum, chitonized and darkened; antennae 4 jointed.

Thorax.—With 3 pairs of small, mamma-like, unchitonized, fleshy, legs; faintly yellowish chitonized spots on pleura; prothorax similarly chitonized dorsally.

Abdomen.—Segment 3 annulate (or 4, counting the intersegmental skin); pleura prominent with a slight, possibly very faintly chitonized, longitudinally creased, swelling; prolegs absent with a pair of slight, pale, humps on the 8th abdominal segment and a similar slightly yellowish chitonized pair on the 9th; dorsal anal lobe, terminating in a prong; anal plate, ventral anal lobe and lateral area of dorsal anal lobe haired; lateral area of dorsal anal lobe yellowish with chiton, the ventral anal lobe with palipiform appendages and attened by several spines detached from the mass of that lobe's ornamentation.

This species is recorded¹ boring in blackberry while the specimen described was received through Dr. F. H. Chittenden's office as coming from rose.

Janus abbreviatus Say.

A whitish cylindrical larva, 12 mm. long when nearly full grown and somewhat enlarged dorsally and laterally in thorax.

Head.—Dorsad ventrad length 1.75 mm., breadth 1.50 mm.; pale, but with mandibles, their articulations and labrum, chitonized and darkened; antennae 5 jointed.

Thorax.—With 3 pair of small unchitonized mamma-like, fleshy, legs; faintly yellowish chitonized spots on the pleura; prothorax similarly chitonized dorsally.

Abdomen.—Segments, distinctly 2 annulate laterally and with a small third annulet dorsally; pleura prominent; venter 3 annulate; prolegs absent; a pair of pale, rounded humps on the 8th abdominal segment and a pair of similarly placed but less elevated, yellowish, chitonized, spots on the 9th; dorsal anal lobe terminating in a prong; anal plate and ventral lobe somewhat haired; lateral area of dorsal anal lobe bare excepting 2 or 3 long prominent hairs and more yellowish than anal plate or ventral anal lobe; the ventral anal lobe with palipiform appendages at the posterior lateral extremities.

¹ Connecticut State Geological and Natural History Survey Bulletin No. 22.

This species is recorded¹ from Willow and Poplar and the following notes were obtained in my rearing it from the latter host.

The material was collected by Mr. Harry B. Weiss at New Brunswick, New Jersey, August 7, 1915. The larvae were boring down the twigs and were considerably beyond the killed portion. August 26, 1915 two adults *Tetrastichus* species emerged. September 7, 1915 some larvae in a fresh collection of infested twigs had lined a portion of their burrow then occupied with a thin glazed, transparent membrane. September 11, 1915 a single adult of *Euryglossa* species emerged. May 31, 1916 a female of *Janus abbreviatus* and a female of *Microbracon* species had emerged. *Janus* continued to emerge until June 17, 1916.

Janus integer Norton.

Agreeing with the description of *Janus abbreviatus* but found boring in the pith of *Ribes* species (currant).

Material of this species was collected by Mr. Walter H. Snell at West Falmouth, Massachusetts, August 23, 1916 in *Ribes* species, sent to the Bureau of Entomology and placed in rearing. By September 18, 1916 three as yet undetermined Chalcids had emerged. *Janus* was at this time in the larval stage. On May 21, 1917 *Janus* began emerging and a single Proctotrypoid was found in cage.

Cephus cinctus Norton.

A whitish cylindrical larva, 11 mm. long when nearly full grown and somewhat enlarged dorsally and laterally in the thorax.

Head.—Dorsad ventrad length 1.5 mm., breadth 1.33 mm.; pale but with mandibles, their articulations and labrum chitonized and darkened; antennae 5 jointed.

Thorax.—Agreeing with description of that of *Janus abbreviatus*.

Abdomen.—Segments distinctly 3 annulate; the first annulation broad and sometimes faintly partially, sub-divided; pleura prominent; venter 3 annulate; prolegs absent; 8th abdominal segment with barely discernible white spots; 9th without the yellowish spots; dorsal anal lobe terminating in a prong; anal plate, lateral area of dorsal anal lobe and ventral anal lobe haired and white; ventral anal lobe with palpiform appendages at posterior lateral extremities and accompanied by several hairs quite separated from the rest of the lobe's ornamentation.

Material received from Cereal and Forage Crops Insects, Bureau of Entomology under Webster No. 8892 from *Elymus canadensis*.

¹ Connecticut State Geological and Natural History Survey Bulletin No. 22.

***Hartigia cressoni* (Kirby).**

Whitish cylindrical larva, 22 mm. long when nearly full grown and somewhat enlarged dorsally and laterally in the thorax.

Head.—Dorsad ventrad length 1.87 mm., breadth 1.66 mm.; pale but with mandibles, their articulations and labrum chitonized and darkened; antennae 5 jointed.

Thorax.—With 3 pairs of medium size, fleshy, mamma-like, slightly chitonized, (especially the prothoracic) legs; pleura with chiton spots as has the pro- and meta thorax dorsally.

Abdomen.—Segments 3 annulate; pleura moderately prominent, yellowish, and glossy with chiton; prolegs absent; slightly chitonized circles on the 8th abdominal segment and larger more heavily chitonized spots on the 9th; dorsal anal lobe terminating in a prong; anal plate, lateral area of dorsal anal lobe and ventral anal lobe haired, chitonized (the plate, the least), and yellow; ventral anal lobe with palpiform appendages at the posterior lateral extremities and accompanied by hairs which are a part of that lobe's ornamentation and not separated from the rest.

Material collected by Essig from *Rubus* in California.

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